

WAYS INTO THE LOGIC
OF
ALEXANDER OF APHRODISIAS

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KEVIN L. FLANNERY, S.J.
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BY

KEVIN L. FLANNERY, s.J.



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PRINTED IN THE NETHERLANDS

Dedicated to
FRANCIS R. and MARY C. FLANNERY
(my parents)

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1.2.2.1	[p. 6]	The context. It is important first of all to understand <i>why</i> Alexander presents various types of ecthetic proof. The definitional and perceptual proofs are logically prior to the syllogistic itself. Of these two, the perceptual proof is the better supported textually.
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† See Appendix (“Logical Symbols and Conventions”).

- procedures(s) give us a perspicuous understanding of the definitional proof (second version).
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- 1.3.1 [p. 25] The definitional and perceptual proofs compared. There is reason to believe that Alexander regarded the definitional proof as more rigorous than the perceptual (the governing element of which is one’s perceiving of the ectethen). On the other hand, sometimes a perceptual proof is more faithful to the text.
- 1.3.2 [p. 27] Alexander the Theophrastan. Alexander’s primary complaint against Theophrastus is that his understanding does not fit the Aristotelian text. Alexander’s method of proof by perception is basically Theophrastan; he is concerned however to fit it to the text.
- 1.3.3 [p. 30] The role of quantifiers. We saw (in section 1.2.2.3)

- how, in the definitional proof of conversion of the universal negative, Alexander moves between standard syllogistic propositions like BiA and propositions about singulars. Examination of some remarks concerning rejected combinations points to a special role for propositions such as BiA: they are canonical. Moreover, anything in canonical form is potentially a universal.
- 1.3.4 [p. 35] Light shed on the Darapti proof. Appreciation of the place of canonical form in Alexander's thought clears up an obscure passage. It raises also some familiar questions about how Alexander regarded the perceptual.
- 1.3.5 [p. 38] Two Łukasiewiczian objections.
- 1.3.5.1 [p. 38] The role of singulars. As explained in section 1.2.1, a problem with Łukasiewicz's approach is that his ectethen is not a singular. He maintains this in opposition to Alexander's position that Aristotle uses perceptual proof(s). But Łukasiewicz's two arguments against Alexander are not compelling.
- 1.3.5.2 [p. 40] Łukasiewicz thinks the perceptual non-logical; but the perceptual need not be so construed. On the other hand, Alexander himself has some reservations about the perceptual: something perceived (however this is construed) is not in canonical form. What then is Alexander's attitude toward his own perceptual proofs? Smith's arguments that he disdains them cannot be sustained. Still, on other grounds, it is possible to say that he is not entirely happy with them.
- 1.3.6 [p. 45] Syllogistic proofs: an apparent inconsistency. Is the ectethen a proper or an improper part? Both possibilities have support.
- 1.3.6.1 [p. 46] We can resolve the question by attending to Aristotle's concept of ὅπερ ἐκεῖνό τι.
- 1.3.6.2 [p. 49] That Alexander takes this approach is confirmed at in *A.Pr.*121 and also at in *Metaph.*124.
- 1.4 [p. 52] Conclusion.

Chapter Two: The contents of On mixed premisses

- 2.1 [p. 53] Introduction. The modal syllogistic was controversial from the beginning. Theophrastus appears to have had a different analysis (the peiorem rule). Alexander's was contained in *On mixed premisses*.
- 2.2 [p. 59] Philoponus speaks in his commentary of the "sides" to the debate. He considers the Theophrastan argument, which involves types of necessity and the (connected) notion of "genuine parts." Most importantly, he talks about Sosigenes. We should read the pertinent passage in a way that makes Alexander agree with Sosigenes. The Alexandrian position (assuming he and Sosigenes agree) would involve the idea that the adduction of terms for " $AaB \ \& \ NBaC \rightarrow AaC$ " and non-adduction of terms for ' $NAaB \ \& \ BaC \rightarrow NAaC$ ' is significant. There is, however, an internal implausibility in Philoponus's account.
- 2.3 [p. 65] Pseudo-Ammonius also speaks in his commentary of the "sides" to the debate. And we find again the notion of "genuine parts" but with a difference: pseudo-Ammonius suggests a necessary conclusion *must* be derived. There is a connection between the pseudo-Ammonius passage and *On mixed premisses*.
- 2.3.1 [p. 68] Relationship between Philoponus and pseudo-Ammonius. The two depend on a common source ("On Mixed Premisses.").
- 2.3.2 [p. 70] A difference regarding the reductio solution. Philoponus and pseudo-Ammonius both comment on a reductio proof of " $NAaB \ \& \ AaC \rightarrow NAaC$." Pseudo-Ammonius incorrectly ascribes it to Alexander. Philoponus therefore is the better source in this regard. There is a lesson on this: Alexander's style is subtle, his preferred position often difficult to establish.
- 2.4 [p. 74] Hypothetical necessity.
- 2.4.1 [p. 74] Philoponus and pseudo-Ammonius compared. In Philoponus hypothetical necessity is hypothetical necessity "while the predicate (of the conclusion) holds"; in pseudo-Ammonius, the hypothetical character

- seems to be bound up with the middle term. Is pseudo-Ammonius more reliable? Yes and no.
- 2.4.2 [p. 75] A look at Alexander's *in A.Pr.*140 (more particularly 140.14–28) gives some answers. Alexander suggests that Sosigenes isolated the notion of a limiting term: i.e., a term such as 'movement' which pertains to a temporary state. Alexander and pseudo-Ammonius and Alexander work to cross-purposes: pseudo-Ammonius uses this approach to say that Sosigenes is to be faulted; Alexander uses it to say that Sosigenes got over the problems of Aristotle's approach.
- 2.4.3 [p. 78] Moraux thinks Alexander's *in A.Pr.*140.25–8 is anti-Sosigenes. But, for textual reasons and because Sosigenes is known to have been in favour of the Aristotelian position, this cannot be correct. But *how* does Alexander's *in A.Pr.*140.25–8 help Sosigenes? We have to look at another Aristotelian notion first: the notion of "universals not limited in respect of time." Alexander presumes this notion in his account of Aristotle's understanding of assertoric-apodeictic mixed modal syllogisms.
- 2.4.4 [p. 81] With respect to Alexander's *in A.Pr.*140.29–34, Moraux fails to distinguish limited (i.e., syllogistic) necessity from hypothetical necessity. It is possible that Sosigenes also failed to make this *terminological* distinction—although he employed what Alexander calls hypothetical necessity.
- 2.4.5 [p. 83] Alexander's *in A.Pr.*141.1–6 argues that Aristotle introduced hypothetical necessity in his *Int.* This understanding is consistent with the Philoponus passage (*in A.Pr.*126) where he uses the pertinent *Int.* passage to the same (i.e., pro-Sosigenes) purpose.
- 2.4.6 [p. 85] The last bit in this series (i.e., *in A.Pr.*141.6–16) is not anti-Sosigenes. Moraux has the larger section wrong: in general intent, it is not anti-Sosigenes.
- 2.4.7 [p. 86] Alexander discusses hypothetical necessity at *in A.Pr.*129–30. According to Alexander, we must assume the weak *dictum de omni* with regard to apodeictic premisses. If one maintains the strong

dictum, then Aristotle is defeated, since one has to account for everything that *might* turn up within the modal compass of the major term. With regard to ‘NAaB & BaC \rightarrow NAaC,’ therefore, Aristotle would have in mind hypothetical necessity—necessity in which it is stipulated that, if something stands outside the modal compass of the major, it is not pertinent to what the syllogism says. The final remark (*in A.Pr.*130.23–4) in this passage says that Aristotle’s mention of terms is important. (See also section 2.2.)

- 2.5 [p. 92] Arabic evidence.
- 2.5.1 [p. 92] Although their acquaintance with it was anything but direct, there is evidence in the Arabs pertaining to the contents of *On mixed premisses*.
- 2.5.2 [p. 94] In Averroes’ *Questions* (more particularly question 4), we learn that Alexander and Theophrastus are agreed on one thing: the assertoric premiss in ‘NAaB & BaC \rightarrow NAaC’ is ambiguous. Alexander, however, rejects Theophrastus’s idea that we can decide the issue by looking to the concrete world. He prefers to look to terms. Alexander also accuses Theophrastus of regarding an assertoric as a genus not containing a modality. (This becomes important in chapter 3.)
- 2.5.3 [p. 99] The nature of necessity.
- 2.5.3.1 [p. 99] The “Refutation fragment” (which speaks of grades of necessity) is a fragment of *On mixed premisses*.
- 2.5.3.2 [p. 101] In the fragment, Alexander is probably defending Theophrastan grades of necessity. He does this elsewhere, as well. In one passage (*in A.Pr.*156–7), we learn of three grades of Theophrastan necessity. Type 3 is very weak—limited necessity; type 1 is the strongest type; type 2 is hypothetical necessity. Type 2 must be the type spoken of in the refutation fragment: i.e., that which characterizes ‘man holds of Socrates.’
- 2.5.3.3 [p. 106] Thus, Philoponus can be vindicated on a good number of counts. He is a good reporter: he speaks of types of necessity; he remarks that one type of hypothetical necessity “comes closer to the proper sense

of necessity”; most importantly, he records the notion that the adduction of terms for ‘ $AaB \ \& \ NAaC \rightarrow AaC$ ’ and non-adduction of terms for ‘ $NAaB \ \& \ BaC \rightarrow NAaC$ ’ is significant. Philoponus, however, can be faulted on a number of other counts.

- 2.6 [p. 108] Conclusion.

Chapter Three: Logical matter

- 3.1 [p. 109] Introduction.
- 3.2 [p. 110] What is matter?
- 3.2.1 [p. 110] The modern conception: logic is about form, not matter.
- 3.2.2 [p. 111] Alexander appears to have a similar understanding, but in *A.Pr.*26–8 tells a somewhat different story. His remarks at in *A.Pr.*26.25ff certainly mark logic off from “what underlies and is meant by” its propositions; but this is only the point we saw him making against Theophrastus: that the mode of a proposition is not determined by looking to the way things stand in the world. Remarks that follow these suggest that matter—i.e., the way a predicate holds of a subject—does have a place in logic. When, a bit later yet, he speaks of “ignoring” the material aspect, he is not reversing this position. He is saying that although matter properly belongs to logic, logic operates by abstracting from it, as Aristotle abstracts universals from particulars.
- 3.2.3 [p. 114] An approach very much like the former is found in the modern concept of “dummy letters”—as opposed to logical variables. A dummy letter can be regarded as having meaning; a variable is more like a gap waiting to be filled. Alexander says something very similar, although his position is typically subtle.
- 3.2.4 [p. 116] A split between those who conceived of “general rules” (or dummy letters) and those who conceived of “empty rules” became apparent after Alexander. Philoponus took the more Alexandrian position, Ammonius the other.

- 3.2.5 [p. 118] Although there are passages where Alexander speaks of matter as if its type could be established by looking simply to it (as we look to clay—that “stuff”—and see that it is not solid like steel), there are other passages where it is apparent that matter depends on the larger context within which the stuff appears.
- 3.3 [p. 123] The claims of section 3.2 (including subsections) can be substantiated and developed by attending to some more texts.
- 3.3.1 [p. 123] At *in Top.*21, Alexander discusses a syllogism which has good form but faulty matter (i.e., a false premiss) and also one which has faulty form which vitiates its matter—even though the latter consists of true propositions. The asymmetry here shows that the two notions—logical matter and logical form—are correlative: if the form is defective, so will be the matter, regardless of the sort of stuff it is.
- 3.3.2 [p. 125] At *in Top.*10, Alexander compares certain types of Stoic arguments to saws made of wax. Although their premisses are true and contain therefore in one sense correct matter, in another sense their matter is faulty. Such arguments are “flabby,” since they do no work. Again we find that logical matter depends on proper logical form.
- 3.3.3 [p. 126] At *in Metaph.*148, Alexander confronts directly an issue which has been in the background of much of the present discussion: the impact of contextual considerations upon the object of knowledge. Alexander acknowledges quite openly that for Aristotle being differs according to how (and by whom) it is known.
- 3.3.4 [p. 129] At *in A.Pr.*13–14, it is suggested that syllogistic matter is connected with the seriousness of the enterprise within which it appears. Also (once again) it appears that matter is correlative with syllogistic form.
- 3.4 [p. 131] Many of the considerations that have surfaced thus far have parallels in modern discussions about natural deduction. A syllogism that is part of a worked-out science is like a theorem proved by means of a discourse (in Corcoran’s sense). It is awarded in natu-

- ral deduction an assertion sign; Alexander, in a similar way, speaks of a special sort of matter. A difference between Alexander's theory and natural deduction would be the former's effort to connect logic with metaphysics.
- 3.5 [p. 136] Can matter be said to "conclude"? Barnes argues that this is an elementary error on Alexander's part. Barnes is certainly right, although it must also be said that the error points to a characterizing feature of Alexander's logic.
- 3.5.1 [p. 142] That Alexander was not completely confused with regard to matter is demonstrated by attending to his comments on *Phys.*195a15–21.
- 3.6 [p. 144] Conclusion

GENERAL INTRODUCTION

The only solid biographical information we have regarding Alexander of Aphrodisias are the opening remarks of his essay ‘On fate’ where he mentions the Emperors Septimius Severus and Caracalla, who had appointed him to a chair of philosophy [*Fat.*164.3].¹ Mention of Caracalla and non-mention of Geta suggest that he took up the chair sometime between 198 and 209 A.D.² The chair may very well have been one of the four chairs of philosophy established in Athens by Marcus Aurelius. It has traditionally been held that he did teach in Athens; but this tradition is based on a passage in Galen which, as we now know, refers not to our Alexander but to one Alexander of Damascus. So, it is at least possible that he taught not in Athens but in some other place, such as Rome.³ It is also a reasonable surmise that the ‘Aphrodisias’ which forms part of his name refers to Aphrodisias in Caria, for it was a center of culture and philosophy.

Alexander is the major Aristotelian commentator of the ancient world. He wrote commentaries on all the components parts of the *Organon*,⁴ on the more philosophical of Aristotle’s other works, and on the *Meteorologica*.⁵ He also wrote a number of works which, strictly-speaking, are not commentaries but rather independent compositions on specific themes. Of those which survive or of which we have evidence, we can say that they too are thoroughly Aristotelian in

¹ For further biographical and historical information concerning Alexander (including more extensive argumentation and references than I give here), see Todd (1976b), pp. 1–20, Thillet (1984), pp. vii–lxxiii, and Barnes et al (1991), pp. 1–4. In the present work I adopt the now fairly standard convention of employing double inverted commas for quoted material and as scare quotes. Everywhere else I employ single inverted commas.

² Caracalla was made Augustus in 198, Geta in 209.

³ Lynch assumes that Alexander operated at least for a time in Rome [Lynch (1972), p. 193]; Todd rejects this notion [Todd (1976b), p. 1, n. 2].

⁴ The commentary on *SE* which appears under Alexander’s name as volume 2.3 of the *Commentaria in Aristotelem Graeca* is actually by Michael of Ephesus. Todd seems to suggest that Alexander didn’t write a commentary on *SE* [Todd (1976b), p. 14], but Sharples reports that a commentary is mentioned among the Arabs [Sharples (1987), p. 1184].

⁵ For the complete list of Alexander’s writings—those which survive and those which don’t—plus a modern bibliography, see Sharples (1987).

spirit and intent. A case in point is the essay "On fate," of which Alexander, still addressing the Emperors, says:

The book comprises the doctrine concerning fate and responsibility held by Aristotle, of whose philosophy I am the champion, having been nominated a teacher of it on your recommendation [*Fat.*164.13–15].

Of these independent compositions there are a number devoted to logical topics: a treatise on the conversion of propositions, one on utterances, one on hypothetical syllogisms, and one on mixed modal syllogisms. The treatises on conversion and utterances survive (in Arabic); the ones on hypothetical and mixed modal syllogisms, as far as we know, do not—although I shall argue in chapter 2 that we do possess at least one fragment of the latter. Alexander composed also some shorter pieces on specific logical questions, some of which survive among his *Quaestiones*. He also makes mention of some "logical notes."⁶

Alexander's influence was enormous. He is quoted extensively by later Aristotelian commentators writing in Greek such as Simplicius, Philoponus, and Ammonius—thanks to whom we have a fairly clear idea of what was contained in some of his lost commentaries. He was known by Plotinus, by the Arabs (such as Averroes and al-Fārābī), by Thomas Aquinas. His teaching regarding the immortality of the soul was condemned by the Fifth Lateran Council.⁷ In our own day, besides constituting a rich source for texts—his writings pre-date our earliest Aristotelian manuscripts—, Alexander is still a contender in the interpretive field. This fact, I hope, will become more apparent over the course of the present work.

Of influences on Alexander, we know a fair bit about two of his teachers: Sosigenes and Herminus, both of whom make appearances in the commentary on the *Prior Analytics* (which is the Alexandrian text I make most use of in what follows).⁸ Alexander seems not to have maintained great esteem for the latter,⁹ but (as I shall argue in chapter 2) his regard for Sosigenes was higher than is often represented. Indeed, I shall argue (*pace* Moraux) that Alexander's approach

⁶ in *A.Pr.*250.2.

⁷ Peters (1968b), p. 233.

⁸ I shall refer to this work, as is customary, by means of the abbreviation *in A.Pr.* The same abbreviation serves also for other ancient commentaries on Aristotle's *Prior Analytics*. When *in A.Pr.* refers to a commentary other than Alexander's, I shall try to make this very clear.

⁹ See *in A.Pr.*74.6, 125.16 and also Moraux (1984), pp. 382–394.

to mixed modal syllogisms is to a large extent derived from that of Sosigenes.

Alexander's greatest influences, however, were more ancient. First of all, of course, there is Aristotle—as whose “champion” he regarded himself. But we must, I think, in the same breath also mention Theophrastus, Aristotle's student and successor as head of the Peripatos. In digging about in Alexander's logical writings, I was at first surprised to turn up areas of substantial agreement between Alexander and Theophrastus—and particularly where the current wisdom speaks of disagreement and even outright rejection. As I continued digging, I came to expect to find this blend of soil: the writings of Aristotle and Theophrastus, it is clear to me now, are where Alexander has his roots. A teacher such as Sosigenes was for Alexander a way *into* a better understanding of what he wanted to know—as were, in another way, the Stoics;¹⁰ but Alexander's thought grows *out* of Aristotle and Theophrastus too. In any case, it is no slip that Alexander is described in one of the Aristotelian scholia as the “exegete of Aristotle and Theophrastus.”¹¹ In terms of influence on Alexander, Theophrastus is not to be put in the same category with other minor philosophers he might mention.

This is not to say that Alexander regarded Theophrastus with the reverence he extended to Aristotle. Although, as I said, I have found many areas of agreement between Alexander and Theophrastus, there remain areas of disagreement—and Alexander makes no effort to disguise this fact. (One that will play a large part in chapters 2 and 3 is their divergent understanding of how a proposition comes to be assigned a mode: necessary or contingent). Nonetheless, Alexander regards what Theophrastus says with the utmost seriousness, recalling (doubtless) that Theophrastus had studied under Aristotle and was more likely than anyone else to reflect the Philosopher's mind. To state Alexander's disposition in this respect succinctly: he is less inclined to find disagreement between Aristotle and Theophrastus than (if he can) to use Theophrastus as the genuine interpretation of problematic Aristotelian passages, even where such interpretation might go beyond what actually survives of Aristotle's words. This seems to me a wholly reasonable investigative principle.

The present work is intended to be an introduction to *Alexander's*

¹⁰ Note that Lynch thinks that Herminus and Sosigenes might have *been* Stoics [Lynch (1972), p. 215].

¹¹ *schol.*155b8–9; FHS&G 96B.

logic. A point-by-point treatment of Alexander's logical writings (besides being an enormous task) would not produce this. First of all, much of what might be called Alexander's logic is simply Aristotelian logic—and that falls beyond the scope of the intention I have just enunciated. Secondly, much of what is distinctive in Alexander's logical writings has to do with his dialogue with (or, perhaps more precisely, opposition to) the Stoic logical tradition. It is not my intention to go into this material either, except to the extent that it helps to explain Alexander's own ideas. (This occurs in chapter 3, for instance, where Alexander's dismissal of the Stoics' duplicating and non-differently concluding arguments sheds a good deal of light on his positive conception of Aristotelian syllogistic deduction.) I take up, rather, three themes, one from each of the main areas of traditional logic: the assertoric syllogistic,¹² the modal syllogistic, and the area of metalogical concerns. There will be aspects of Alexander's thought which, on account of this way of proceeding, I skip over; but this is inevitable in any introduction. The other possible concern—that the resulting account of Alexander's logic might be very disjointed—will be dispelled, I am quite sure, as the reader proceeds through it.

In chapter 1, I examine Alexander's conception of the Aristotelian method of proof known as "ecthesis." This conception has attracted the attention of a number of modern commentators—most notably Jan Łukasiewicz, who criticized Alexander for (among other things) introducing into logic the non-logical. I argue that, in order to make a fair assessment of Alexander's position, we need to distinguish among the various ecthetic proofs he actually uses in *in A.Pr.*—which are three in number (if we include the one which I call "definitional").

What emerges from an examination of these types of ecthetic proof is especially four things: 1) an appreciation that Alexander shared Łukasiewicz's concern about the non-logical; 2) an initial conception of Alexander's attitude toward Theophrastus; 3) a distinctly non-modern conception of the role of singulars in logic—indeed, of the role of (categorical) propositions in general, and 4) a similarly non-modern conception of the relationship between logic and metaphysics—more particularly, the metaphysical notion of form. In addition, we learn in this chapter, I think, a great deal about Alexander's

¹² Actually, my discussion of ecthesis also involves to a small extent the modal syllogistic but not in any essential way. The method of ecthesis itself belongs basically to the assertoric syllogistic.

way of proceeding. In a word: it is *subtle*. Alexander treads very delicately, especially when discussing other philosophers' interpretations of Aristotle.

This becomes very important in chapter 2, where I discuss the possible contents of the lost work, *On mixed premisses*. It has often been assumed—and not only in modern times—that Alexander rejected Theophrastus's apparently anti-Aristotelian conception that the mode of a syllogism follows the “weaker” of the modes of its two premisses. I argue that this is not so—or, at least, that it needs to be qualified. Alexander's primary concern seems to have been to reconcile the Theophrastan and Aristotelian accounts. And indeed, we must be sceptical of any suggestion that this was entirely a *forced* reconciliation, since Alexander had before him many of Theophrastus's works which we do not have. That said, however, neither is it true that Alexander accepts uncritically Theophrastus's analysis of modal propositions.

Pinning down just what Alexander and Theophrastus thought about mixed modal syllogisms is a complex matter—primarily because our evidence is so fragmentary. In chapter 2, I examine primarily Philoponus's report concerning *On mixed premisses* and pseudo-Ammonius's rival account. This examination is, I'm afraid, very long and deliberate; but, given the nature of the evidence, I see no other way to make my case decisively. I also use at the end of this chapter a few Arabic sources which I have read in translation, consulting also experts in the field of Arabic logic. As I explain more fully below, my remarks with respect to Arabic sources must necessarily be offered with less confidence and claim to authority than those based on Greek sources. I do not pretend to have made a thorough study of Arabic logic, which is a little-cultivated field in any case, the cultivation of which would require tools which are not at my disposal.

Among the many things that emerge from chapter 2 are some ideas about the relationship of propositions to the actual world—or, alternatively, about the role of matter within logic. This dovetails nicely with the theme of chapter 3, which is devoted specifically to Alexander's understanding of logical matter. Indeed, this chapter ties together a number of themes from the two previous ones. It raises again the issue of the relationship between the logical and meta-physical, such as made an appearance in chapter 1. It also points up some similarities between Alexander's approach and that of modern natural deduction (which is a subtheme of chapter 1). Most promi-

nently, however, it allows me to develop a point which surfaces in chapter 2 concerning a difference between Alexander and Theophrastus concerning the nature of logic. This gives us a sort of overview of Alexandrian logic as a unity.

I have many people to thank (none of whom can be blamed, of course, for the shortcoming of this book). Also, I hope that those I do not mention by name will believe me that the universals I employ are *Aristotelian* universals, which really contain the singulars to which they refer!

First of all, I thank my family, especially my father and my mother. I thank my Jesuit superiors for allowing me to do the work which went into this book, especially Howard Gray and Joseph Daoust. I thank also my Jesuit brothers, colleagues and friends in Oxford and at the Gregorian University, Rome, who have been an enormous source of friendship, inspiration, and encouragement.

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CHAPTER ONE

ECTHESIS

1.1 *Introduction*

The Aristotelian method of proof known as ἔκθεσις (“ecthesis”)¹ has received a good deal of scholarly attention in recent years. Indeed, its modern reputation has improved considerably, having been described originally by Łukasiewicz as “of little importance to the [Aristotelian] system,”² being regarded more recently by some as the partially-hidden keystone of the syllogistic.³

¹ By speaking of the “method of proof known as ἔκθεσις” I mean to pick out one use of the word in Aristotle and in Alexander, who use ἔκθεσις (and its related forms, ἐκτίθημι, etc.) in a number of different senses [see Patzig (1968), pp. 156–59]. Alexander calls this one use the τρόπος τῆς ἐκθέσεως (*in A.Pr.*103.27, 104.8, 106.20). It has to do primarily with logic in the limited sense—although, as we shall see, what is within logic “in the limited sense” is not always easy to determine in Alexander. We shall not be much concerned with the sense of the term according to which certain things, usually terms, are “extracted from their background” for the sake of a reader (or pupil). (Aristotle uses this sense at *An.Pr.*48a25 and 49b6; it occurs in Alexander’s *in A.Pr.* at any number of places—e.g., 77.33–78.1, 98.20–3, 173.8, 294.29, 353.11, 379.14.) Another (related) sense of ἔκθεσις is that according to which something is “explained,” perhaps by means of a diagram. Although this sense is not precisely the one I want to isolate here, the fact that it exists in the Greek used by Aristotle and Alexander tells us something about the nature of ecthesis (in the sense we are concerned with here). That is, it seems to be related to geometrical or mathematical procedures (see his *in A.Pr.*31.18–19). Philoponus also compares Aristotle’s philosophical method to that of a geometer: *in A.Pr.*10.28ff. Ammonius, in connection with *Int.*22a14, speaks of ἡ ἔκθεσις τῶν προτάσεων [*in Int.*232.28]. (Alexander too, at *in A.Pr.*361.34–5, speaks of ecthesis of propositions.) Ammonius seems to mean by this the arrangement of propositions in a diagram, so this usage is connected also with the previous sense. (See also Philoponus [*in A.Pr.*467.10], who speaks of the ecthesis of a θεωρήμα.) Einarson discusses the geometrical origin of the term ἔκθεσις at Einarson (1936), pp. 161–2; especially noteworthy are p. 161, nn. 50 and 52. See also Maier (1900), v.IIb, pp. 141–49, especially p. 141, n. 1, and Mignucci (1991).

² Łukasiewicz (1957), p. 59; also Corcoran (1974b), p. 128 (n. 20). Łukasiewicz has some support from Aristotle himself, who (in general) uses ecthesis only after all other methods of proof have failed him. See Aristotle’s summary comments in *An.Pr.*A7 where he does not even mention ecthesis, although he describes the other methods.

³ See Smith (1983), *passim*; Thom (1976), p. 308; Thom (1981), pp. 90, 167; Ebbinghaus (1964), p. 57, n. 1; Lee (1984), p. 93, n. 24; Lorenzen (1958), §2; Hintikka (1978), pp. 57–60 and *passim*; Henle (1949), p. 99, n. 28; Mignucci (1965a), pp. 181–4, especially n. 111. The notion that ecthesis can be used more widely than

The analysis of Aristotelian ecthesis put forward by Alexander of Aphrodisias in his commentary on *Prior Analytics* A, although frequently referred to in the modern literature, has received far less direct attention. When it is considered, Alexander is invariably misrepresented as saying that the method of ecthesis is a purely perceptual affair—and he is accused in connection with this of failing to understand the fundamental nature of logic. Besides, however, there being a need to counter this misapprehension, Alexander's treatment of ecthesis deserves close attention for a number of other reasons. First, his remarks contain good evidence that the process of ecthesis and associated topics were much discussed during his time and before⁴ and provide us with hints as to the nature of this intercourse. Second, we find in Alexander's commentary some remarkable anticipations of modern treatments of singular terms, parts of classes,⁵ and the existential quantifier. Finally, we find in his account an attempt to relate the process of ecthesis to Aristotle's metaphysical system. This attempt might serve as a contribution even to modern Aristotelian scholarship on the *Prior Analytics* and the *Metaphysics*.

The aim of this chapter, however, is primarily this: to give an exegesis, in as perspicuous a manner as possible, of Alexander's remarks in *in A.Pr.* on the proof method known as ecthesis. I shall actually speak of three types of proof: the definitional, the perceptual and the syllogistic. Only the last two of these are properly speaking ecthetic. Although he certainly relates it to ecthesis proper, Alexander never refers to his definitional proof as ecthesis and at one point even suggests that it is not to be so regarded.⁶ He does however clearly regard this method as an alternative to one of his ecthetic proofs (see *in A.Pr.* 32.32–34) and its structure is also very clearly ecthetic, as we shall see. There is no doubt therefore it has a place in the present treatment.⁷

For organizational reasons, I try to keep separate in this chapter

in fact Aristotle uses it is not new: see al-Fārābī's *Short Commentary on Aristotle's Prior Analytics* [= Rescher (1963b), p. 42].

⁴ For such earlier consideration of ecthesis see Graeser (1973), pp. 75–6, 85–6.

⁵ For the current debate, see Lewis, D. (1991). For the parallel ancient debate, see Barnes (1988).

⁶ I have in mind his words at *in A.Pr.* 32.32–34 which suggest that, as opposed to the definitional proof which he has just set out, the perceptual (which immediately follows) is “δι' ἐκθέσεως”: ἢ ἄμεινόν ἐστι καὶ οἰκειότατον τοῖς λεγομένοις τὸ δι' ἐκθέσεως καὶ αἰσθητικῶς λέγειν τὴν δεῖξιν γεγενῆσθαι.

⁷ Most commentators simply confuse the definitional with the more properly ecthetic proof(s) which follow it (see, for instance, Volait (1907), p. 13).

exposition and interpretation. The first section is devoted primarily to setting out in fairly formal terms what is involved logically in these various methods of ecthesis. Unavoidably, however, even this expository section contains a certain amount of interpretation. I begin by giving, as a reference point, the outlines of a modern analysis of one Aristotelian use of ecthesis. This analysis originates with Jan Łukasiewicz. Then I take up Alexander's definitional proof, such as we find at *in A.Pr.*32.7–21. (This section is rather long, for many of the issues which come into the other types of ecthesis come up first of all with regard to this type.) Having discussed the definitional proof, I move on to perceptual ecthesis, such as we find at *in A.Pr.*33.2ff and at *in A.Pr.*98–101. Finally, I examine uses of syllogistic ecthesis in these earlier sections of Alexander's commentary but, most importantly, his use of syllogistic ecthesis to validate Baroco and Bocardo with two apodeictic premisses, which proof is found at *in A.Pr.*122–23. It is here, as Alexander says, that syllogistic ecthesis is really required by Aristotle.

Having concluded this generally expository section, I shall take up a number of interpretative issues which present themselves. An important issue in this section will be the reason why (and to what extent) Alexander rejected the Theophrastan approach to ecthesis.⁸ I shall also consider in this section the way in which perceptual ecthesis is related to syllogistic ecthesis and whether (and in what sense) Alexander regarded the former as a lesser form of proof. (At this point I come back to Łukasiewicz and some objections he raised to Alexander's exegesis of Aristotle.) Finally, I return to Alexander's remarks on apodeictic Baroco and Bocardo, which remarks give us a clearer understanding of what Alexander regarded as essential to his various methods of proof by ecthesis.

⁸ Sometimes it will be easier if (as here) I refer simply to Theophrastus when I mean Theophrastus and Eudemus. Volait, incidentally, points to a pair of passages in which it becomes clear that Alexander also sometimes mentions only Theophrastus when he means Theophrastus and Eudemus: *in A.Pr.*41.22–24, 220.9–10 [Volait (1907), pp. 18–19]. In the *back*-reference (at p. 220) he mentions Eudemus, but not in the original (p. 41).

1.2 *Expository matters*1.2.1 *A modern treatment*

By general agreement, Aristotle's first employment of the "method of ecthesis" occurs at *An.Pr.*25a14–17, where he argues for the conversion of universal negatives ("e-propositions"). The text runs as follows:

First then take a universal negative with the terms A and B. Now if A holds of none of the Bs, B will not hold of any of the As; for if it does hold of some (say of C), it will not be true that A holds of none of the Bs—for C is one of the Bs.⁹

It will be useful at this point to introduce some conventions in order that we might set things out fairly formally. I employ therefore Lemmon's natural deduction system, Patzig's abbreviations (AaB, BoC, etc.),¹⁰ and the following equivalence: 'XiY ↔ -XeY,' referred to as 'e-df' (definition of e-propositions). (I will propose other equivalences as they become relevant.)

We might then argue for the convertibility of the e-proposition in this fashion:

{1}: AeB ⊢ BeA		
1	(1) AeB	A
2	(2) BiA	A
2	(3) AiB	2 i-conversion
2	(4) -AeB	3 e-df
1,2	(5) AeB & -AeB	1,4 &I
1	(6) -BiA	2,5 RAA
1	(7) BeA	6 e-df

The problem with this derivation, however, is line 3, where we go from BiA to AiB. This would be legitimate, of course, given a rule of i-conversion (such as is invoked above), but as Alexander points out, Aristotle is not entitled to i-conversion at this stage in the *Prior Analytics*. And, in any case, did he employ it here, since he will use e-conversion in his proof of i-conversion, he would be arguing in a circle.

It is obvious, however, from the above quotation that Aristotle

⁹ In this translation (and in those throughout this chapter) I reverse Ross's policy of preferring τῶν (in expressions such as τῶ μηδενὶ τῶν A) to τῶ. See Ross (1949), pp. 293–4; Smith (1989), p. 236; Flannery (1991), p. 188. Smith, correctly I believe, points to the bearing that this expression has on the process of ecthesis.

¹⁰ See Patzig (1968), pp. 1–2, 8–12, 49–50 and Lemmon (1965); see also Appendix ("Logical Symbols and Conventions").

was aware that he could not resort to such a straightforward proof that $AeB \vdash BeA$. For at *An.Pr.*25a16, instead of saying “for if A does hold of some B, B holds of some A,” etc., he says, “for if it does hold of some [B] (say of C), it will not be true that A holds of none of the Bs—for C is one of the Bs.”

Such a proof is, on the face of it, valid. The difficulty in modern times has been to restate the proof in a manner that is both true to the Aristotelian text and also consistent with modern logical techniques, by means of which the validity of the proof might be rigorously confirmed. The first such attempt was that made by Łukasiewicz. He introduced into the syllogistic, as he understood it, the following “ecthetic” rules:

- (i) $AiB \leftrightarrow (EX)(AaX \& BaX)$
- (o) $AoB \leftrightarrow (EX)(AeX \& BaX)$ ¹¹

Inserting the first of these into the above argument, we get:

{2}: $AeB \vdash BeA$		
1	(1) AeB	A
2	(2) BiA	A
2	(3) $(EX)(BaX \& AaX)$	2 (i)
4	(4) $BaC \& AaC$	A
4	(5) BaC	4 &E
4	(6) AaC	4 &E
4	(7) $AaC \& BaC$	5,6 &I
4	(8) $(EX)(AaX \& BaX)$	7 EI ^a
2	(9) $(EX)(AaX \& BaX)$	3,4,8 EE
2	(10) AiB	9(i)
2	(11) $-AeB$	10 e-df
1,2	(12) $AeB \& -AeB$	1,11 & I
1	(13) $-BiA$	1,2,12 RAA
1	(14) BeA	13 e-df

We have here, then, a valid argument for the convertibility of the e-proposition. Łukasiewicz’s proof has the undoubted advantage of

¹¹ See Łukasiewicz (1957), pp. 61–2 and Patzig (1968), p. 161. The symbol (E) here is the existential quantifier; for the universal quantifier, I use (). For this use of quantification over predicates, see Appendix (Logical Symbols and Conventions). I explain the rule EE and EI^a also in the Appendix. The following proof is not precisely what Łukasiewicz gives [Łukasiewicz (1957), pp. 61–2]. The main differences between the present proof and that of Łukasiewicz are: (1) Łukasiewicz does not work within a natural deduction system; (2) he does not formalize the reductio itself, worrying himself only over the conversion of the i-proposition; (3) he simply asserts the commutative law of conjunction (I use instead &E and &I).

not relying on the conversion of the i-proposition, nor (a point to which we shall come back below) does it employ the mood Darapti, which (like i-conversion) Aristotle has not yet introduced. It will be noticed also that it depends on the commutation of the conjunction BaC & AaC (which is achieved in steps (4) through (7)). Says Łukasiewicz, “We see [from the above proof] that the true reason of the convertibility of the i-premiss is the commutability of the conjunction.”¹² It is this move which allows us to reverse the position of the terms of BiA without employing i-conversion.

Łukasiewicz’s proof has the apparent disadvantage that the introduced term (the ἐκτεθέν),¹³ despite indications in *An.Pr.*25a14–19, does not appear as a singular but as an element in a universal—or actually two universals: BaC and AaC.¹⁴ This too is an issue to which we shall return. For the moment, however, we have before us one modern approach to ecthesis. Let us turn now to Alexander.

1.2.2 *The definitional proof of e-conversion*

1.2.2.1 *The context*

Alexander gives a “definitional” proof of e-conversion at *in A.Pr.*32.7–21. In order to understand what this means and also in order (ultimately) to understand how criticisms of Alexander have missed their mark insofar as they fail to distinguish among the various types of Alexandrian ecthesis, it is essential that we have in view the overall structure of *in A.Pr.*31.1–35.19, which constitutes in fact a short essay on the proof of e-conversion by ecthesis. We find in this essay three extended proofs: a definitional, a perceptual, and a syllogistic proof.

¹² Łukasiewicz (1957), p. 62.

¹³ Aristotle uses this term for the “thing taken out” at *An.Pr.*30a12. Alexander also speaks of the ἐκτιθέμενον [*in A.Pr.*33.2]. Since I shall talk about the ἐκτεθέν (or the plural ἐκτεθέντα) very often in this chapter, from now on I shall give these words in their transliterated form.

¹⁴ Łukasiewicz regarded this aspect in fact as an advantage for his system, since he was of the opinion that Aristotle had banished singular terms from the syllogistic [Łukasiewicz (1957), pp. 5–7]. The question of the role of singulars in the syllogistic is a difficult one, but it is clear that Aristotle was not wholly inimical to them. See especially Thomas (1952), pp. 207–8; Patzig (1968), pp. 4–8; Smith (1982b), p. 119, and Barnes’s unfortunately unpublished paper, “Non-Syllogistic Inference in the *Prior Analytics*.” See also Ackrill (1962), p. 109; Barnes (1975), p. 141; Barnes (1981), p. 51; Bochenski (1951), p. 47; Mignucci (1969), p. 443; Thom (1976), pp. 308–10. Also interesting is Papyrus Oxyrhynchus 3320 [= Appendix, fragment 1, in FHS&G, pt.1], a comment on *An.Pr.*47b29ff, perhaps by Theophrastus. Mignucci presents an understanding of the role of singulars which comports well with the understanding presented below [Mignucci (1965a), pp. 83–4, and also 114–5, 159–60].

Indeed what he says here serves as a sort of introduction to ecthesis, and Alexander will refer back to it in subsequent comments.¹⁵

After some general remarks (*in A.Pr.*31.4–26), Alexander takes up the issue raised by “some” (τινες, 31.27) that Aristotle would appear to prove the convertibility of the e-proposition by means of the conversion of the i-proposition. He defends Aristotle from this charge, saying that, on the contrary, he proves the conversion “by means of items already proved and supposed.”¹⁶ Then follows the definitional argument [32.11–21] (which we shall set out and discuss below).

Having set out this proof, he remarks (*in A.Pr.*32.32–34) that it would perhaps be “better and most faithful to the text to say that the proof proceeds by means of exposition and perception and not by the method described nor syllogistically.”¹⁷

This perhaps is the reason that the definitional approach effectively disappears from *in A.Pr.* at this point: it does not seem to be what Aristotle has in mind. In accordance with this objection, he then gives a perceptual proof, in which an individual, identified first as ‘T,’ then as Theo (θέων), becomes the essential component in the proof.

Finally, having left the reader dangling with his remark at *in A.Pr.*32.34 that the perceptual method would not be “syllogistic,” he explains how a syllogistic proof might run by offering two such formulations, one through the third, the other through the first figure (*in A.Pr.*34.9–20).¹⁸ He remarks, however, that “it is untimely to prove something by a syllogism when we do not yet know about

¹⁵ See for instance *in A.Pr.*100.24–5.

¹⁶ διὰ τῶν ἐφθακότων δεδειχθαι τε καὶ κείσθαι [*in A.Pr.*32.8–9]; see also *in A.Pr.*32.31–32. Alexander means that the conversion can be proved on the basis of the definitions of ‘of every,’ ‘of no,’ ‘in as in a whole,’ ‘part of.’ He speaks at *in A.Pr.*53.20–1 of the concepts ‘of every’ and ‘in as in a whole’ as each being “a sort of principle and primary.” At *in A.Pr.*54.10–11 (and also 22–25), he says that ‘of every’ accounts for the self-evidence and perfection of Barbara and Celarent. Indeed, 54.13–18 reads very much like a definitional proof of Barbara. See also *in A.Pr.*55.1–3, 61.3–5, 69.16–20 and 126.1–8. (Cf e.g. Philoponus, *in A.Pr.*188.20–1; 198.19–20; 201.18–19; Boethius, *syll.cat.* 809C–810C.)

¹⁷ ἢ ἄμεινόν ἐστι καὶ οἰκειότατον τοῖς λεγομένοις τὸ δι’ ἐκθέσεως καὶ αἰσθητικῶς λέγειν τὴν δεῖξιν γεγονέναι, ἀλλὰ μὴ τὸν εἰρημένον τρόπον μηδὲ συλλογιστικῶς. At one time I agreed that this last phrase should be translated, ‘not by the method described, i.e., not syllogistically’ (see Barnes et al (1991), p. 88). For reasons that will become apparent, I do not think this can be right. Alexander’s remarks at *in A.Pr.*32.32–34 are, it seems to me, proleptic: a preliminary indication of how the perceptual proof is distinctive.

¹⁸ The second of these, however, is not an ecthetic proof but an argument by substitution. See Łukasiewicz (1957), p. 10.

sylogisms” (*in A.Pr.*34.20–1). The section ends with Alexander’s running through the other propositional candidates for conversion, the acceptable ones being proved by means partially of e-conversion—which has of course been proved independently.

That then is the general structure of *in A.Pr.*31.1–35.19. We can glean a good deal of information by attending simply to it. Most importantly, we can see that Alexander very much wants to construct his proof of e-conversion upon a foundation that is prior to the syllogistic itself. Besides the one just quoted, he makes remarks to this effect at *in A.Pr.*33.15 (“we do not yet know anything about syllogistic proofs”) and 34.5 (“the latter [i.e., the syllogistic proof] would not have been timely”). These remarks are all made in order to point out the superiority (as an interpretation of Aristotle) of the perceptual over the syllogistic proof; but they serve also to some extent to mark off the definitional proof from the syllogistic, since the definitional shares with the perceptual proof this advantage of priority. Secondly, according to this conception of the relationship among the types of ecthesis, neither the definitional nor the perceptual proof could possibly involve the syllogism Darapti (or any other syllogism).¹⁹ Therefore, when we analyze those proofs below, we will want to avoid employing this (or any other) syllogistic mood.

1.2.2.2 *The basis of the definitional proof*

The prior foundation upon which Alexander sets his definitional proof is the passage in Aristotle traditionally referred to as the *dictum de omni et nullo*, *An.Pr.*24b26–30:²⁰

That one term should be in another as in a whole is the same as for the other to be predicated of all of the first. We say that one term is predicated of all of another, whenever nothing can be found of the subject of which the other term cannot be asserted; ‘to be predicated of none’ must be understood in the same way.

τὸ δὲ ἐν ὅλῳ εἶναι ἕτερον ἐτέρῳ καὶ τὸ κατὰ παντὸς κατηγορεῖσθαι θατέρου θάτερον ταύτόν ἐστιν. λέγομεν δὲ τὸ κατὰ παντὸς κατηγορεῖσθαι ὅταν μὴδὲν ἢ λαβεῖν [τοῦ ὑποκειμένου] καθ’ οὗ θάτερον οὐ λεχθήσεται· καὶ τὸ κατὰ μηδενὸς ὡσαύτως.²¹

¹⁹ Thus, note 21 at Barnes et al (1991), p. 88, is wrong.

²⁰ See Barnes et al (1991), p. 87, n. 20.

²¹ Ross’s apparatus criticus notes that Alexander does not read τοῦ ὑποκειμένου at *An.Pr.*24b29 and thus he puts the two words within brackets. See *in A.Pr.*24.29, 32 and also 54.7—also Barnes et al (1991), p. 199. Wallies includes τοῦ ὑποκειμένου within the quotation at *in A.Pr.*24.29 but this is probably not correct.

It is to this passage that Alexander refers when he speaks of τό τε κατὰ παντός καὶ κατὰ μηδενός καὶ ἐν ὅλῳ καὶ ἐν μηδενί (*in A.Pr.*32.9–10)—i.e., these are the “items already proved and supposed” (32.8–9).

Most modern commentators regard the δὲ at the beginning of the second sentence as simply copulative. It is possible however that Alexander sensed a note of contrast in it—as if we were to translate, “We, however, say that one term . . .”. Whether he would have attached this point to the δὲ of Aristotle’s text, it is certainly the case that, according to him, the expressions ἐν ὅλῳ τῷ and κατὰ παντός are the same *except that* κατὰ παντός is used when our thought processes begin with the predicate and ἐν ὅλῳ τῷ when they begin with the subject. This is what he says at *in A.Pr.*25.9–11.²²

It is important to bear in mind in this connection that the expression ἐν ὅλῳ τῷ does not mean what it appears to mean. That is, one would expect ‘A is ἐν ὅλῳ τῷ B’ to mean that ‘A is in the whole of B,’ i.e., A is found everywhere in B or A holds of every B. But in fact the Greek means just the opposite. ‘A is ἐν ὅλῳ τῷ B’ is true if and only if B is true of every A. B is, as it were, a whole for A—or, perhaps, A is wholly within B.²³

Thus, according to Alexander, κατὰ παντός and ἐν ὅλῳ τῷ work in opposite “directions”: if A is predicated of every B, B is in A “as in a whole.”²⁴ Or, in more formal language:

$$(ke)^{25} \text{ } x \text{ κατὰ παντός } y \leftrightarrow y \text{ ἐν ὅλῳ τῷ } x^{26}$$

²² See also Ammonius, *in A.Pr.*33.33–34.1 and Philoponus, *in A.Pr.*39.3–7.

²³ See Barnes et al (1991), p. 28, n. 124; p. 111, n. 55, and p. 123, n. 98.

²⁴ I adopt this traditional, somewhat cumbersome, translation of ἐν ὅλῳ τῷ. It is important to recognize that the relation εἶναι ἐν ὅλῳ τῷ is different from the relation ‘inheres in’ and that the relation κατηγορεῖσθαι κατὰ is different from the relation ‘is said of.’ Both these other relations (‘inheres in’ and ‘said of’) are discussed at *Cat.*1a23–29. As Furth argues, these two metaphysically-loaded expressions are “indifferently expressed” by the locution ‘is predicated of’ (see Furth (1988), pp. 9–40, especially p. 10). ‘In as in a whole,’ on the other hand, is just the converse equivalent of ‘is predicated of’ (or, more precisely, ‘is predicated of every’) [*An.Pr.*24b26–8]. See also Mignucci (1965a), pp. 224–233.

²⁵ The signatures for the equivalences I shall use in this chapter are mnemonics, cuing on the first letter of the Greek phrases involved. Thus, the rule which allows us to move from κατὰ παντός to ἐν ὅλῳ τῷ is called (ke), that which allows us to go from ἐν ὅλῳ τῷ to τὶ τοῦ is called (et), and so on. Since these rules are equivalences, a rule can be cited with the appropriate letters in either order (e.g., ‘(et)’ or ‘(te)’), depending on the direction of the implication it brings about. This use of what seem like logical rules to manipulate bits of language might seem strange to us. But we must recall that in a sense the syllogistic never really leaves the realm of natural language: it merely selects certain natural language expressions and uses these as canonical forms.

²⁶ This equivalence is stated by Alexander at (10) in the quotation below. It is alluded to in steps (13) and (14).

1.2.2.3 *The definitional proof itself*

So then, I set out now the definitional proof as found at 32.11–21. I give it first in English, then in the Greek with interspersed numbers for easier reference.

If it is supposed that A holds of no B, he says that it follows from this that B holds of no A. For if B holds of some A (this is the opposite of what was supposed, and one of the two must be true), let it hold of C; for let C be some of A of which B holds. Now C will therefore be in B as in a whole and will be some of B, and B will be said of every C, since ‘in as in a whole’ and ‘of every’ mean the same. But C was some of A; C, therefore, is also in A as in a whole. But if it is in A as in a whole, A will be said of every C. But it was supposed that C was some of B. Therefore A will be predicated of some of B. But it was supposed that A is said of no B—and ‘of none’ meant that there is no B of which A is predicated.

(1) κειμένου γάρ τοῦ Α μηδενὶ τῷ Β Φησὶν ἔπεσθαι τούτῳ (2) τὸ καὶ τὸ Β μηδενὶ τῷ Α· (3) εἰ γὰρ τὸ Β τινὶ τῷ Α ὑπάρχει (τούτο γάρ ἐστὶ τὸ ἀντικείμενον τῷ κειμένῳ, καὶ δεῖ τὸ ἕτερον αὐτῶν ἀληθὲς εἶναι), (4) ὑπαρχέτω τῷ Γ· (5) ἔστω γὰρ τοῦτο τὶ τοῦ Α, (6) ᾧ ὑπάρχει τὸ Β. (7) ἔσται δὴ τὸ Γ ἐν ὅλῳ τῷ Β καὶ (8) τὶ αὐτοῦ, (9) καὶ τὸ Β κατὰ παντός τοῦ Γ· (10) ταῦτόν γάρ τὸ ἐν ὅλῳ καὶ τὸ κατὰ παντός. (11) ἀλλ’ ἦν τὸ Γ τὶ τοῦ Α· (12) ἐν ὅλῳ ἄρα καὶ τῷ Α τὸ Γ ἐστίν· (13) εἰ δὲ ἐν ὅλῳ,²⁷ (14) κατὰ παντός αὐτοῦ ῥησθήσεται τὸ Α. (15) ἦν δὲ τὸ Γ τὶ τοῦ Β· (16) καὶ τὸ Α ἄρα κατὰ τινός τοῦ Β κατηγορησθήσεται· (17) ἀλλ’ ἔκειτο κατὰ μηδενός τὸ Α τοῦ Β· (18) ἦν δὲ κατὰ μηδενός τὸ μηδὲν εἶναι τοῦ Β, καθ’ οὗ τὸ Α κατηγορηθήσεται.

The design of this argument is, to say the least, obscure. We might understand it along the lines of the following ‘proof’ (from which

²⁷ The Aldine edition (a) appears troubled by the words τῷ Β καὶ τὶ αὐτοῦ, καὶ τὸ Β κατὰ παντός τοῦ Γ· ταῦτόν γάρ τὸ ἐν ὅλῳ καὶ τὸ κατὰ παντός. ἀλλ’ ἦν τὸ Γ τὶ τοῦ Α· ἐν ὅλῳ ἄρα καὶ τῷ Α τὸ Γ ἐστίν· εἰ δὲ ἐν ὅλῳ [*in A.Pr.* 32.15–18], which it cuts out. The effect of this emendation (if it is such) is to remove the obscure parts of the argument. Setting out the argument in the style explained below, we would have:

{to prove: AeB ⊢ (2) BeA}

- | | | |
|-------|-------------------------|---|
| (1) | AeB | A |
| (3) | BiA | A |
| (4,6) | B ὑπάρχει τῷ α Α | |
| (7) | α is ἐν ὅλῳ Β | |
| (5) | α is τὶ τοῦ Α | |
| (14) | Α is κατὰ παντός τοῦ α | |
| (15) | α is τὶ τοῦ Β | |
| (16) | Α is κατὰ τινός τοῦ Β | |
| (17) | Α is κατὰ μηδενός τοῦ Β | |

But the Aldine also adds an incomprehensible καὶ τὸ before κατὰ παντός at 32.18 (i.e., just before (14)), which suggests that perhaps we have here scribal (or typesetter’s?) error.

most of the technical details—such as assumption numbers, etc.—are omitted and steps are associated by number with the above text):

- {3}: (1) AeB \vdash (2) BeA
 (1) AeB A
 (3) BiA A
 (4,6) B ὑπάρχει τῷ α²⁸ A
 (5) α is τὸ τοῦ A
 (7) α is ἐν ὅλῳ τῷ B
 (8) α is τὸ τοῦ B
 (9) B is κατὰ παντὸς τοῦ α
 (11) α is τὸ τοῦ A
 (12) α is ἐν ὅλῳ τῷ A
 (14) A is κατὰ παντὸς τοῦ α
 (15) α is τὸ τοῦ B
 (16) A is κατὰ τινὸς τοῦ B
 (17) A is κατὰ μηδενὸς τοῦ B

(Thus (3) must be false and (2) is true.)

Although much here is obscure, one thing is clear: the point of the argument is to reverse the order of A and B without invoking i-conversion (which, as we said above, has yet to be proved by Aristotle). Thus, Alexander sees as key what Łukasiewicz sees as key: commutation. By the time we get to steps (14) to (16), this has been achieved: A is on the left, α in the middle, and B on the right.²⁹ Alexander needs only to eliminate the assumed α (the ectethen) in order to have the desired ‘A is κατὰ τινὸς τοῦ B’ (which contradicts assumption (1)).

But if this is the argument, what role do steps (7) through (9) play? Step (9) seems especially strange. It is (8) which is eventually repeated at (15), at the culmination of the argument; why bring in (9) at all? And there is another problem: if, as Alexander says at (10), ἐν ὅλῳ and κατὰ παντὸς are the same, why not just work with these? Why worry about relations like ὑπάρχει τῷ and τὸ τοῦ?

The first of these difficulties is resolved when we realize that Alexander has not presented the steps of his reasoning in their logical order. In particular, (9) is out of place. Alexander’s task, as I said, is to reverse the positions of the terms of BiA. He must there-

²⁸ The symbol α here replaces the Γ of the text. This makes it more clear that the ectethen is τὸ τοῦ A.

²⁹ I shall argue below that in Alexander this situation warrants the assertion of the corresponding i-proposition: AiB.

fore begin with B on the left side: this is the position in which it (or any term) stands when it is predicated *κατὰ παντός*, as in (9). Thus (9) precedes (7)—which in fact follows from it by (ke).³⁰

That still leaves a couple of rough spots in our understanding of Alexander's proof. The first of these concerns the expression 'x ὑπάρχει τῷ y.' Alexander presupposes in the proof before us that a term can be predicated of something else only if that of which it is predicated is separated from it, at least conceptually. For instance, over the course of the definitional proof we shall have occasion to move from the proposition BiA to the conjunction, Ba & Aa, where the Greek letter α signifies that this thing (α) is tied to the subject term (A).³¹ Now, the relationship between A and α is at this point too close to say that A ὑπάρχει τῷ α; but it is quite legitimate to say that B ὑπάρχει τῷ α. In short, in order to assert 'x ὑπάρχει τῷ y,' x has to be in the position of a predicate and y in the position of a subject.

I add therefore the following equivalence to Alexander's system:

$$(uk) \ x \ ὑπάρχει \ τῷ \ y \leftrightarrow x \ κατὰ \ παντός \ y$$

I have called this rule (uk), although Alexander seems to regard expressions like *κατηγορεῖσθαι κατὰ* and *λέγεται κατὰ* as meaning much the same.³² The core notion seems to be that the predicate term "comes down upon" something which is separated from it as subject. With a bit of effort, this equivalence too can be found in the *dictum de omni et nullo*—more specifically, in the words: *λέγομεν δὲ τὸ κατὰ παντός κατηγορεῖσθαι ὅταν μηδὲν ἢ λαβεῖν [τοῦ ὑποκειμένου] καθ' οὗ*

³⁰ The *καὶ* which introduces (9) should probably therefore be translated 'as well as'—giving us something along these lines: "Now C will therefore be in B as in a whole and will be some of B, as well as B's being predicated of every C." This understanding of the logical structure of this part of the argument makes sense of the *δὴ* in (7), which one would otherwise be inclined (with manuscript L) to emend to *δὲ*. C's being in B as in a whole (i.e., C's being a part of B) follows from B's being said of every C.

³¹ Similarly, β would be tied to B. For a more precise account of this, see note 37 below.

³² This seems to be the case in Aristotle as well: compare *An.Pr.* 24a18, 24b17 and 24b30. Neither Aristotle nor Alexander appears here to recognize the metaphysically-loaded sense of *λέγεται τοῦ* that Furth identifies. But even Furth acknowledges that sometimes Aristotle is careless in this regard [Furth (1988), pp. 10–11]. Smith regards *ὑπάρχειν* as a component in Aristotelian canonical form [Smith (1982b), p. 119]. Angelelli says that in Aristotle the "expression *καθ' ὑποκειμένου λέγεσθαι* undergoes a radical change. . . ; in *Categoriae* it means essential predication, whereas outside *Categoriae* it means (perhaps only) accidental predication, i.e., accidents being predicated of substances" [Angelelli (1967), p. 110]. See also Chung-hwan (1957).

θάτερον οὐ λεχθήσεται· καὶ τὸ κατὰ μηδενὸς ὡσαύτως (*An.Pr.*24b28–30).³³

The second rough spot is the role of the relation $\tau\dot{\iota}$ τοῦ. Alexander assumes in the definitional argument—note the shift from (7) to (8) and from (11) to (12)—that we can move from ‘x is $\tau\dot{\iota}$ τοῦ y’ to ‘x is ἐν ὅλῳ τῷ y’ and vice-versa. He must derive this rule also from the *dictum de omni et nullo*. Aristotle assumes there that the ὑποκειμένον (which is in the predicate as in a whole) has parts: μηδὲν ἢ λαβεῖν [τοῦ ὑποκειμένου] καθ’ οὗ θάτερον οὐ λεχθήσεται. So we have another equivalence:

$$(tc) \ x \text{ is } \tau\dot{\iota} \text{ τοῦ } y \leftrightarrow x \text{ is ἐν ὅλῳ τῷ } y$$

The $\tau\dot{\iota}$ is the ectethen itself: it is around this pivot that the terms of AiB will be turned to give BiA.

That completes the list of “items already proved and supposed” in the definitional proof. There is one more rule at work here, however, which is in fact the most interesting of all. Alexander never explicitly adverts to it—did he, he would possibly have to reconsider the claim that the definitional proof is based on things “already proved and supposed.”³⁴ In any case, the rule he presupposes is the rule which allows him to take something which satisfies the specifications of the i-proposition assumed as the starting point for the reductio argument, work with it until he derives what he requires, and then return to an expression in standard categorical form (i.e., another i-proposition). Lemmon calls this manner of proof (or something very much like it) existential quantifier elimination (EE). That which is taken out is very similar to what Lemmon calls the “typical disjunct.”³⁵

The justification of the Lemmon procedure is, according to Lemmon, “somewhat as follows”:

³³ The τοῦ ὑποκειμένου, which Ross isolates, becomes fairly important in this regard. It is much easier to find (uk) here if we read it. See above note 21.

³⁴ The proof also presupposes the reductio method (in Lemmon’s system, RAA). Philoponus worries that perhaps Aristotle is not entitled to the reductio rules, since he has not yet introduced them [*in A.Pr.*49.14–15]. His solution to this difficulty is to argue that mathematicians do the same as a matter of course (*in A.Pr.*49.17). It is perhaps then significant that Alexander mentions mathematicians at *in A.Pr.*31.18–19 and also recalls that Aristotle has discussed the notion of contradictory (on which the reductio method depends) at *Int.*, chapter 7. See also *Conv.*, pp. 63–4 (details about this work in bibliography). For Alexander’s understanding of the reductio method, see Flannery (1993), pp. 203–205.

³⁵ Lemmon (1965), pp. 112–13. Lemmon’s typical disjuncts are propositions about “arbitrarily selected objects.” The letters which represent them are not proper names but (as he puts it) “arbitrary names” (see pp. 106–7 and 111). See Appendix (Logical Symbols and Conventions).

{L1}: If something has a certain property, and if it can be shown that a conclusion C follows from the assumption that an arbitrarily selected object has that property, then we know that C holds; for if something has the property, and no matter which has it then C holds, then C holds anyway.³⁶

It is unlikely that Alexander suppressed acknowledgement of this procedure: more likely he regarded it as obviously justified.

Alexander's version of this procedure, it must be said however, is somewhat different, the difference suiting the procedure to what takes place in ecthesis. That is, instead of going from an existentially quantified form of the i-proposition (i.e., from $(Ex)(Bx \ \& \ Ax)$) to *anything* satisfying the specifications of the i-proposition (i.e., to 'Bc & Ac,' where 'c' represents an arbitrarily selected something), Alexander takes a part of A ($\tau\acute{\iota} \ \tau\omicron\upsilon \ A$) of which B holds ($\acute{\upsilon}\pi\acute{\alpha}\rho\chi\epsilon\iota$). So, given BiA, we assume $B\alpha \ \& \ A\alpha$, where $A\alpha$ means ' α is $\tau\acute{\iota} \ \tau\omicron\upsilon \ A$ ' and $B\alpha$ means $B \ \acute{\upsilon}\pi\acute{\alpha}\rho\chi\epsilon\iota \ \tau\omicron\upsilon \ \alpha$.³⁷

But, if Lemmon's procedure is valid for the assumption of "an arbitrarily selected object," *a fortiori* it must be valid for something arbitrarily selected from the domain of things to which it is acknowledged an argument pertains.³⁸ We might therefore recast Lemmon's justification in this fashion:

³⁶ Lemmon (1965), pp. 112–13.

³⁷ Note that the Greek letter α is "tied" to its corresponding Roman term-letter, A. It is for this reason that $A\alpha$ is read ' α is $\tau\acute{\iota} \ \tau\omicron\upsilon \ A$.' $B\alpha$, on the other hand, is read $B \ \acute{\upsilon}\pi\acute{\alpha}\rho\chi\epsilon\iota \ \tau\omicron\upsilon \ \alpha$, on account of the disparity between the letters. This tying of letters brings Alexander's procedure close to the Thom and Smiley procedures, which employ many-sorted logic and tie "individual variables" to term-variables. See Thom (1976), *passim*, Thom (1981), pp. 170–174, and Smiley (1962), *passim*. In speaking of different sorts of entity they do not mean that, for example, actual physical or perceptible objects might come into a logic but rather that the logic in question might contain variables of more than one sort. (Note that Smiley and Thom refer to individual-variables not individual-constants: Smiley (1962), p. 58, Thom (1981), p. 170. See also Church (1956), §55.24.) Thus, they would allow into the syllogistic not only categorical terms such as A, B, C, but "a range of individual-variables . . . corresponding to each term-variable" [Thom (1981), p. 170]. Thus, $\alpha_1, \alpha_2, \alpha_3$, etc., would correspond (be "tied") to the term-variable A. In what follows we shall not need to distinguish among the parts falling under A, so a symbol such as α might be understood as one in a series such as the above series, $\alpha_1, \alpha_2, \alpha_3$, etc. Also, it should be regarded as one of these, arbitrarily selected: for the procedure we are interested in is a type of EE procedure. And one more caveat: as we shall see, there is reason to believe that Alexander doubted that every ectethen might be made to mesh in a satisfactory fashion with syllogistic canonical form.

³⁸ Barnes argues that Aristotle had the requisite "natural deduction" notion of proving by arbitrarily selected things [Barnes (1975), p. 120]. See *An.Post.* 73b32–74a3 where Aristotle speaks not only of selecting an arbitrary thing but of a thing

{L2}: If a predicate holds of some of a subject, and if it can be shown that a conclusion C follows from the assumption that the predicate holds of an arbitrarily selected something within that ‘some’ of the subject, then we know that C holds; for if the predicate holds of something of the ‘some’ of the subject and no matter of which it holds C holds, then C holds anyway.

When in this justification I speak of the “‘some’ of the subject,” I am referring to the part of A, mentioned in the categorical proposition BiA, of which B holds. When I speak of an arbitrarily selected something within this ‘some,’ it is to be understood that this “something” could be an improper part.³⁹

So then, employing the equivalences (uk), (ke), and (et),⁴⁰ it is remarkably easy to fit the Greek of *in A.Pr.*32.11–21 into a Lemmon-type argument employing EE:⁴¹

{4}: (1) AeB ⊢ (2) BeA		
1	(1) AeB	A
3	(3) BiA	A
i	(i) ⁴² Ba & Aα	A
i	(4/6) Ba [=B ὑπαρχειν τῷ α]	i &E
i	(9) B is κατὰ παντός τοῦ α	4/6 (uk)
i	(7) α is ἐν ὅλῳ τῷ B	9 (ke)
i	(8) α is τὶ τοῦ B	7 (et)
i	(11) Aα [= α is τὶ τοῦ A]	i &E
i	(12) α is ἐν ὅλῳ τῷ A	11(te)
i	(14) A is κατὰ παντός τοῦ α	12 (ek)
i	(15) α is τὶ τοῦ B	8 (repeat)
i	(16) AiB [A κατὰ τινός τοῦ B]	14,15 EI ^b
3	(ii) AiB	3,i,16 EE.
1,3	(17) AeB & AiB	1,ii &I

taken arbitrarily from a particular class—in this case, the largest of which the pertinent predicate holds.

³⁹ That Alexander recognizes such improper parts of terms is apparent at *in A.Pr.*25.8–9. (Contrast Philoponus, *in A.Pr.*39.15–24.) Whether Alexander would have recognized an improper part as an ectethen is another question. I address it below.

⁴⁰ For easier reference:

(uk) $x \text{ ὑπάρχειν } y \leftrightarrow x \text{ κατὰ παντός } y$

(ke) $x \text{ κατὰ παντός } y \leftrightarrow \text{ἐν ὅλῳ τῷ } x$

(te) $x \text{ τὶ τοῦ } \leftrightarrow x \text{ ἐν ὅλῳ τῷ } y$

⁴¹ See Appendix (Logical Symbols and Conventions).

⁴² Lower case Roman numerals mark steps which I supply for Alexander’s proof in order to bring it into line with modern methods. The additions are uninteresting, being implicit in or slight reworkings of what Alexander actually says.

1	(iii)	-BiA	3,17 RAA
i	(iv)	BeA	iii e-df

1.2.3 *Perceptual ecthesis*

We move on to perceptual ecthesis. Some “textual orientation” is in order at this point, that we might have a clear idea of what Alexandrian texts we are drawing from. Three passages in *in A.Pr.* have become the *loci classici* for Alexander’s position on ecthesis: pp. 31–35 (concerning e-conversion); pp. 98–101 (concerning Darapti) and pp. 121–23 (concerning Baroco and Bocardo with necessary premisses).⁴³ We have already examined the definitional proof found in the first *locus*. This *locus* also contains information on perceptual and syllogistic ecthesis. In the second *locus*, by which time the definitional proof has disappeared from Alexander’s account, we find more material on both the perceptual and syllogistic proofs. The last *locus* is devoted primarily to the syllogistic proof.

In what immediately follows, I shall be treating, in order, perceptual and syllogistic ecthesis. This will involve some skipping about among the *loci*; but I think it is best that we have a fairly comprehensive grasp of what is involved in each method individually before proceeding to the task of comparing them (and also the definitional proof) and drawing conclusions. Some comparing of methods is necessary, however, even for their exposition. I will be tracing therefore a few connections before I get to the interpretative stage proper.

1.2.3.1 *Perceptual e-conversion*

So then, having set out the definitional proof, Alexander gives, beginning at *in A.Pr.*33.2, the alternative perceptual proof. He desires to prove $AeB \vdash BeA$, and he will do it again by means of the reductio method, positing that BiA . In order to avoid simple conversion of BiA , he “takes” something ($\tau\dot{\iota}$)⁴⁴ of which B holds and which

⁴³ There are some other pertinent passages. That at *in A.Pr.*144.23–145.20 (and a close parallel, *in A.Pr.*151.22–30) I will treat of briefly in the section on apodeictic Baroco and Bocardo. See also *in A.Pr.*89.10–28, 103.25–104.9, 106.19–21, 112.33–113.2, 143.14.

⁴⁴ It is impossible to be sure from the word $\tau\dot{\iota}$ (or even the words $\tau\dot{\iota} \tau\omega\nu$) alone, in either Aristotle or Alexander, whether what is being referred to is singular or plural. With regard to Aristotle, although Smith [Smith (1982b), pp. 119–20] is right to say that, in passages where ecthesis is involved and where we also find the expression $\tau\dot{\iota} \tau\omega\nu$ (*An.Pr.*28a24, 28b21, 25a17), the latter is strongly suggestive of a singular taken from a group of singulars, even in the early sections of *An.Pr.* Aristotle

is both perceptible and a subpart of A (δ αἰσθητὸν ὃν μέρϊον ἐστὶ τοῦ A).⁴⁵ He calls this τὶ ‘C,’ although eventually he gives an example of what C might be: the man, Theo (so C is a singular). C is part of both A and B, he says. But instead of going through the steps required by the definitional proof to say that A is predicated of some B (i.e., steps (i) through (15) in proof {4} above), he simply asserts that “A, insofar as it is predicated of C, which is a subpart belonging to it, will also be predicated of some B, since C is a subpart of B” [*in A.Pr.*33.6–7]. The idea seems to be that, with the conception of C as part of both A and B before the mind’s eye, it is obvious not only that BiA but also that AiB. This is not, as he says, to *convert* the i-proposition: it is to advert to that from which i-conversion follows [*in A.Pr.*33.22–23]. Having then derived AiB, by employing the rule pertaining to reductio proofs (that is, RAA), he is able to assert BeA.

Now, we might want to represent this proof in the following fashion (using the standard EE procedure out of Lemmon):⁴⁶

can use the τὶ of τὶ τῶν to refer to the possibly plural: see *An.Pr.*30a22. (The passage concerns the notorious Aristotelian mood ‘NAaB & BaC → NAaC.’ Smith’s remark that the expression τὶ τῶν shows that “Aristotle’s proof procedure . . . relies on ecthesis” [Smith (1989), p. 122] misses the mark. There is no proof procedure involved here: Aristotle’s remark [ἐπεὶ γὰρ παντὶ τῷ B ἐξ ἀνάγκης ὑπάρχει ἢ οὐχ ὑπάρχει τὸ A, τὸ δὲ Γ τὶ τῶν B ἐστὶ, φανερόν ὅτι καὶ τῷ Γ ἐξ ἀνάγκης ἐστὶ θάτερον τούτων] is a general one, a statement of how in his view the necessity attaching to the major of a first figure syllogism affects also all those things which fall under the middle term. As a general point, it cannot be understood as excluding those instances in which the conclusion of such a syllogism might refer to a plurality.) As for Alexander, again τὶ τῶν can refer to a plural. See, for example, *in A.Pr.*126.5–6, 127.30, 299.4–5, 302.1. In one passage dealing with ecthesis (*in A.Pr.*99.33–100.1), Alexander appears to distinguish τὶ τοῦ from τὶ τῶν, as if the former expression itself signalled a possible plural, the latter necessarily a perceptible individual. But the τὶ τοῦ Σ at 99.33 is actually a gloss on τὶ τῶν ὑπο τὸ Σ of 99.23–4. I discuss this passage below.

⁴⁵ Often in Alexander (and in normal Greek), the diminutive μέρϊον is indistinguishable in meaning from μέρος. See, for instance, *in A.Pr.*15.22 and 16.7; and Barnes points to two passages (*Metaph.*Δ,25 and *HA* 486a10–13) where Aristotle seems to use μέρος and μέρϊον interchangeably [Barnes (1988), p. 241, n. 38]. (But even in these passages the notion seems to be preserved that a μέρϊον subdivides a μέρος: see *Metaph.*1023b17–19, where μέρϊον is used of the parts into which a *species* might be divided, and *HA* 486a12–13, where μέρη ὅλα are divided into ἕτερα μέρϊα.) Occasionally, however, Alexander clearly wants to maintain the distinction between the two, as for instance at *in A.Pr.*1.14, 2.5, 3.7, 3.32 and 415.1–6. This is an issue especially in Alexander’s comments on apodeictic Baroco and Bocardo, where the question arises whether Alexander necessarily regarded ectethenta as proper parts. In the following discussion, I will render μέρϊον as ‘subpart’ and μέρος as ‘part.’ On all this, see Barnes (1988), *passim*, but especially pp. 240–2. See also Barnes et al (1991), p. 28.

⁴⁶ Lemmon’s “arbitrary names” (see note 35 above) are given in bold type. Thus, ‘Aa’ signifies that the predicate A holds of an arbitrarily selected object **a**.

{5}: AeB \vdash BeA		
1	(1) AeB	A
2	(2) BiA [= (Ex)(Bx & Ax)]	A
3	(3) Ba & Aa	A
3	(4) Ba	3 &E
3	(5) Aa	3 &E
3	(6) Aa & Ba	4,5 &I
3	(7) AiB [= (Ex)(Ax & Bx)]	6 EI ^b
2	(8) AiB [= (Ex)(Ax & Bx)]	2,3,7 EE
1,2	(9) AeB & AiB	1,8 &I
1	(10) -BiA	2,9 RAA
1	(11) BeA	10 e-df

But, once again, there seems to be something more queer going on in the proof as Alexander actually expounds it. Let us again look at a translation and text with interspersed numbers:

[*An.Pr.*25a14–16: First then take a universal negative with the terms A and B. Now if A holds of no B, B will hold of no A. . . .]

As C, the item set out, we take something which is perceptible and is a subpart of A. For if B is said of something perceptible and particular, C, which is a subpart of A, then this same C will also be a subpart of B, since it is in it. Hence, C will be a subpart of both and in both. So A, insofar as it is predicated of C, which is a subpart of itself, will also be predicated of some B, since C is a subpart of B, being in it.

[*An.Pr.*25a14–16: Πρῶτον μὲν οὖν ἔστω στερητικὴ καθόλου ἡ Α Β πρότασις. (1) εἰ οὖν μηδὲν τῷ Β τὸ Α ὑπάρχει, (2) οὐδὲ τῷ Α οὐδὲν ὑπάρξει τὸ Β . . .] (3) τοιοῦτον γάρ τι λαμβάνεται τὸ Γ τὸ ἐκτιθέμενον, ὃ αἰσθητὸν ὃν μόνιον ἐστὶ τοῦ Α· (4) εἰ γὰρ κατὰ μόνιου τοῦ Α ὄντος τοῦ Γ αἰσθητοῦ τινος καὶ καθ' ἕκαστα λέγοιτο τὸ Β, (5) εἴη ἂν καὶ τοῦ Β μόνιον τὸ αὐτὸ Γ (6) ὃν γε ἐν αὐτῷ· (7) ὥστε τὸ Γ εἴη ἂν ἀμφοτέρων μόνιον καὶ ἐν ἀμφοτέροις αὐτοῖς. (8) κατηγορούμενον δὴ τὸ Α τοῦ Γ ὄντος ἰδίου μόνιου (9) κατὰ τινὸς ἂν τοῦ Β κατηγοροῖτο, (10) ἐπεὶ τοῦ Β τὸ Γ μόνιον ἐστὶν (11) ὃν γε ἐν αὐτῷ [*in A.Pr.*33.2–7].

Obviously, this passage lends itself to the same sort of analysis as we used with the definitional proof. There is one significant difference however in the axiomatic basis of this proof. Here we do not so much find Alexander moving from ὑπαρχειν τῷ to a κατὰ παντός expression; the rule, rather, seems to be that we can move from 'x is said (λέγεται) of y' to 'y is ἐν ὅλῳ τῷ x.' Let us call this rule therefore (le):

$$(1e) \ x \ \lambda\acute{\epsilon}\gamma\epsilon\tau\alpha\iota \ \kappa\alpha\tau\grave{\alpha} \ \tau\omicron\upsilon \ y \leftrightarrow y \ \acute{\epsilon}\nu \ \acute{\omicron}\lambda\omega \ \tau\hat{\omega} \ x$$

The argument of *in A.Pr.*33.2–7 might be said to go then as follows:

{6}: (1) $AeB \vdash (2) BeA$		
1	(1) AeB	A
i	(i) BiA	A
3–4	(3/4) $B\alpha \ \& \ A\alpha$	A
3–4	(ii) $B\alpha \ [= \ B \ \lambda\acute{\epsilon}\gamma\epsilon\tau\alpha\iota \ \kappa\alpha\tau\grave{\alpha} \ \tau\omicron\upsilon \ \alpha]$	3/4 &E
3–4	(6) $\alpha \ \text{is} \ \acute{\epsilon}\nu \ \acute{\omicron}\lambda\omega \ \tau\hat{\omega} \ B$	ii (1e)
3–4	(5) $\alpha \ \text{is} \ \tau\grave{\iota} \ \tau\omicron\upsilon \ B$	6 (et)
3–4	(iii) $A\alpha \ [= \ \alpha \ \text{is} \ \tau\grave{\iota} \ \tau\omicron\upsilon \ A]$	3/4 &E
3–4	(7) $\alpha \ \text{is} \ \acute{\epsilon}\nu \ \acute{\omicron}\lambda\omega \ \tau\hat{\omega} \ A$	iii (te)
3–4	(8) $A \ \lambda\acute{\epsilon}\gamma\epsilon\tau\alpha\iota \ \kappa\alpha\tau\grave{\alpha} \ \tau\omicron\upsilon \ \alpha$	7 (el)
3–4	(9) $A \ \lambda\acute{\epsilon}\gamma\epsilon\tau\alpha\iota \ \kappa\alpha\tau\grave{\alpha} \ \tau\iota\nu\acute{o}\varsigma \ \tau\omicron\upsilon \ B \ [= \ AiB]$	5,8 EI ^b
i	(iv) AiB	i,3–4, 9 EE
1,i	(v) $AeB \ \& \ AiB$	1,iv &I
1	(vi) $-BiA$	i,v RAA
1	(vii) BeA	vi e-df

This is certainly closer to Alexander's thought than {5}. Whether it constitutes a wholly adequate representation of what is said at *in A.Pr.*33.2–7 is a matter we shall discuss below.

1.2.3.2 *The perceptual proof of Darapti*

Let us move on immediately to the proof of Darapti. At *An.Pr.*28a22–3, having just verified Darapti by converting one of the premisses to an i-proposition, Aristotle mentions that it is also possible to verify it by means of the reductio method and by means of ecthesis.⁴⁷ Alexander's first stab at representing this “third kind of proof” is syllogistic:

⁴⁷ Rather strangely, given the elaborate discussion of ecthesis at *in A.Pr.*31–35, Alexander introduces this type of proof as if it were unknown to his reader: “But [Aristotle] does add a third kind of proof. . . . He calls this a proof ‘by exposition,’ and he shows in outline what the method of exposition is” (*in A.Pr.*99.19–22). One might be led to believe that Alexander holds that the present method is a different type from the former (a claim he will make with regard to the apodeictic Baroco and Bocardo method—and which would solve a certain problem I discuss below). But this notion is eliminated by his final remark in this section where he says of the perceptual proof he espouses that “Aristotle’s proof that assertoric universal negatives convert is patently of this type” [*in A.Pr.*100.24–25]. The explanation for his way of introducing the proof would seem to be rather that it is only at this point in the text of the *Prior Analytics* that Aristotle uses the term ἐκτίθημι (in the technical sense we isolated above: see footnote 1). (Aristotle uses the term at *An.Pr.*28a23 and also 28b14.)

Since it is supposed that both P and R hold of every S, if instead of S we take something of those things under S, it is clear that both P and R hold of this, since they hold of everything under S. In this way, it will be proved that P holds of some R. He takes N: given this, he says, P will hold of some R [*in A.Pr.*99.22–27].

He immediately corrects himself, saying that the above proof is just Darapti all over again, and proposes a perceptual proof instead:

But it seems that in this way nothing is gained with regard to proving the point at issue. For what is the difference between assuming that both P and R hold of every S, and taking it that they hold of some part of S, viz. N? The case remains the same if N is taken; for the combination is the same, whether they are each predicated of every N or of S.

Or is this not the proof he uses? For the method of ecthesis proceeds by perception. He does not tell us to take this something of S of all of which both P and R are said (if we did that we would gain nothing), but to take one of the things that fall under perception⁴⁸ and which is evidently both in P and in R. For example, suppose that animal is taken for P and holds of every man, which is S, and rational is taken for R and also holds of every man. Then if we take some perceptible item of S⁴⁹—i.e., some man, say Socrates —, then inasmuch as it is evident and perceptible that he is both animal and rational, it becomes obvious that P, i.e., animal, shares in and holds of some R, i.e., rational [*in A.Pr.*99.27–100.7].

We will address below the question whether the first (syllogistic) proof is indeed inappropriate, as Alexander says; right now we are interested only in setting out perceptual proofs. And about this perceptual proof we might say this: it contains several of the elements we saw in the first perceptual proof, that is, the proof of e-conversion. The ectethen is called τὶ—i.e., ‘part’—of something (or, actually here, τὶ τῶν, “one of the things”—99.34); and it is ἐν P and R (100.1) (which is quite clearly to be ἐν ὅλῳ τῷ P and R).⁵⁰

⁴⁸ τὶ τῶν ὑπ’ αἰσθησιν πιπτόντων—99.34–100.1. Notice that here the τὶ of τὶ τῶν is certainly singular. It was not though at *in A.Pr.*99.23–4.

⁴⁹ αἰσθητόν τι τοῦ Σ (*in A.Pr.*100.4).

⁵⁰ Erringly, I believe, Smith accuses Alexander of overlooking in *An.Pr.*28a24 “one item of textual evidence [that this ecthetic proof employs singulars] . . . although Philoponus saw it: Aristotle says in each case that one should take ‘some one of the Ss (τὶ τῶν Σ).’” Smith then goes on to cite a remark of Philoponus’s regarding e-conversion: Philoponus, *in A.Pr.*49.23–25 (see Smith (1982b), pp. 119–20). Now in the first place, a remark about e-conversion hardly shows that Philoponus saw that, much later, in the Darapti proof, Aristotle must have meant the τὶ in τὶ τῶν Σ to stand for a singular. Secondly, Philoponus’s comment at *in A.Pr.*49.23–25 is not

Most importantly, though, this something that is taken out leads immediately to the desired conclusion: “inasmuch as it is evident and perceptible that he is both animal and rational, it becomes obvious that P, i.e., animal, shares in and holds of some R, i.e., rational.”⁵¹ It would not be worth our while to formalize this argument any further: the proof obviously depends on this “perceptual” examination of the ectethen.

1.2.4 *Syllogistic ecthesis*

1.2.4.1 *The proof of Darapti*

I translated just above the syllogistic proof by ecthesis of the mood Darapti and Alexander’s comments thereupon.⁵² The formalization of the proof as Alexander conceives it is a fairly straightforward matter. Given ‘PaS & RaS,’ we “take something of those things under S [λάβωμέν τι τῶν ὑπὸ τὸ Σ]”⁵³ of which P and R both hold, and deduce an i-proposition:

even a comment on an Aristotelian use of τὶ τῶν but a paraphrase of Aristotle’s εἰ γὰρ τινι, οἷον τῷ Γ (*An.Pr.*25a16)—and, in fact, the point is taken directly from Alexander (*in A.Pr.*32.22–31). Third, where Philoponus does consider the Darapti proof, he never adverts to the τι τῶν Σ of *An.Pr.*28a24, using instead a paraphrase from which the τῶν is excluded: ἐὰν οὖν τι μέρος λάβωμεν τοῦ Σ (*in A.Pr.*102.31). (Nor ought we to presume here that the word μέρος excludes non-singulars, even though Philoponus does go on to speak of a singular: Socrates. At *in A.Pr.*121.21–22, he says, ληπτέον μέρος τοῦ Γ ᾧ τὸ Α οὐχ ὑπάρχει, οἷον τὸ Δ. But then he immediately applies to this ectethen a negative universal quantifier: εἰ τὸ Α οὐδενὶ τῷ Δ, which suggests that a non-singular could just as well have stood in for Δ in the former instance.) Philoponus, indeed, quite often uses τὶ to refer to a plural subject. At *in A.Pr.*107.8–11, when proving by ecthesis the mood Datisi, he takes out of ‘man’ (τι τοῦ ἀνθρώπου—107.9) ‘Scythian’ (Σκύθης). And one page later, in commenting on a passage where Aristotle actually uses the phrase τι τῶν Σ (*An.Pr.*28b21), he takes from the term ‘man,’ not an individual man but a class of men, ὁ Αἰθίοψ [*in A.Pr.*108.8]. It would seem, then, that Philoponus, like Alexander, could read the τι in τι τὶ τῶν (x) as either singular or plural (see above, note 44).

⁵¹ τῷ φανερώς καὶ αἰσθητῶς τοῦτον καὶ ζῶον εἶναι καὶ λογικὸν ἐναργὲς γίνεται, ὅτι καὶ τὸ Π, τοῦτ’ ἔστι τὸ ζῶον, τινὶ τῷ P, τοῦτ’ ἔστι τῷ λογικῷ, κοινωνεῖ τε καὶ ὑπάρχει [*in A.Pr.*100.5–7].

⁵² The Greek for the proof itself is as follows: ἐπεὶ γὰρ κεῖται καὶ τὸ Π καὶ τὸ P παντὶ τῷ Σ ὑπάρχοντα, ἂν ἀντὶ τοῦ Σ λάβωμέν τι τῶν ὑπὸ τὸ Σ, τούτῳ ὑπάρχει δῆλον ὅτι καὶ τὸ Π καὶ τὸ P, εἰ γε καὶ παντὶ τῷ ὑπὸ τὸ Σ. οὕτως δὲ δευχθήσεται καὶ τὸ Π τινὶ τῷ P ὑπάρχον. καὶ λαμβάνει γε τὸ N· τούτου δ’ οὕτως ἔχοντος καὶ τὸ Π, φησί, τινὶ τῷ P ὑπάρξει [*in A.Pr.*99.22–27]. Alexander’s remarks on the proof follow immediately: ἀλλὰ δοκεῖ γε οὕτως μὴδὲν πλέον γεγονέναι πρὸς τὸ δευχθῆναι τὸ προκειμένον. τί γὰρ διαφέρει τῷ Σ ὑπάρχειν λαβεῖν παντὶ τὸ τε Π καὶ τὸ P καὶ μέρει τινὶ τοῦ Σ τῷ N; τὸ γὰρ αὐτὸ καὶ ἐπὶ τοῦ N ληφθέντος μένει· ἢ γὰρ αὕτη συζυγία ἐστίν, ἂν τε κατὰ τοῦ N παντὸς ἐκείνων ἑκάτερον, ἂν τε κατὰ τοῦ Σ κατηγορήται [*in A.Pr.*99.27–31].

⁵³ At *in A.Pr.*99.33, Alexander glosses this with the phrase τι τοῦ Σ.

{7}: PaS & RaS \vdash PiR

1 (1) PaS & RaS	A
1 (2) (EX)(PaX & RaX)	1 EI ^a
3 (3) PaC & RaC	A
3 (4) PiR	3 Darapti
1 (5) PiR	2,3,4 EE

We should take note of a number of things. First of all, step (4) might be derived in another fashion—that is, as Łukasiewicz in effect derives it, using his rule (i) [(EX)(AaX & BaX) \leftrightarrow AiB] and eliminating step (3).⁵⁴ But, since (i) really just tells us that we are allowed to skip over what we find in step (3), there is no essential difference here. Secondly, rather unusually for Alexander in such a context, he uses the word μέρος rather than μόριον of the ectethen (99.29). This may have no significance (i.e., he may here simply be referring to a subpart as a part—which, of course, it is); but neither may it be quite irrelevant to note that his claim that “nothing is gained” with such a proof is bolstered to some extent if the ectethen might be an improper part of the ‘some’ referred to in the conclusion of Darapti. Third, the ectethen, despite the expression τι τῶν ὑπὸ τὸ Σ, could be a plural.⁵⁵ Finally, we might acknowledge that Alexander inserts the ectethen into the context of a universal: he refers to it with the phrase: κατὰ τοῦ Ν παντὸς (99.30–31).⁵⁶ Both these latter facts have a bearing, as we shall see, on the issue of Alexander’s conception of Aristotelian canonical form.

⁵⁴ See Łukasiewicz (1957), pp. 63–4. Rule (i) appears as his thesis (11): “If there exists a C such that P belongs to all C and R belongs to all C, then P belongs to some R.”

⁵⁵ See notes 44 and 50 above.

⁵⁶ See also in *A.Pr.*121.22–3, 121.30 and 123.14. We should be wary, however, of taking such remarks at face value. At in *A.Pr.*144.23–145.20, Alexander points out, first, that it is apparently possible, contrary to what Aristotle says, to derive by ecthesis (involving the change of an o-proposition into an e-proposition) the mood Baroco with assertoric major, apodeictic minor and apodeictic conclusion. But then he goes on to explain that this is only possible to the extent that we assume (falsely) that the *dictum de omni et nullo* (on which, as Aristotle suggests, the modality of a conclusion depends: *An.Pr.*30a22) is playing its typical role through the transformed o-proposition [in *A.Pr.*145.10; see also 129.33–130.2]. This assumption, however, is illegitimate; the suggestion, therefore, is that the transformed o-proposition never becomes, so to speak, a “full-fledged” e-proposition. See also in *A.Pr.*151.22–30.

1.2.4.2 *The proof of e-conversion*

Let us turn back now to the e-conversion proofs. We have seen the definitional and perceptual versions: Alexander also gives a syllogistic proof. Again, it is a *reductio* proof:

Hypothesize that B <holds> of some A, i.e., of every C (where C is something of A), and co-assume the premiss ‘A of every C,’ which is obvious: then it can be deduced in the third figure that A holds of some B. But this is impossible, since it was supposed to hold of none [in *A.Pr.*34.9–13].⁵⁷

The formalization of this argument involves a bit of expansion and some by now familiar moves: the EE procedure and the use of the ectethen within a universal:

{8}: AeB ⊢ BeA		
1	(1) AeB	A
2	(2) BiA	A
3	(3) Bα & Aα	A
3	(4) Bα	3 &E
3	(5) Baα	5 (uk)
3	(6) Aα	3 &E
3	(7) Aαα	6 (te),(ek)
3	(8) AiB	7,5 Darapti
2	(9) AiB	2,3,8 EE
1,2	(10) AeB & AiB	1,9 &I
1	(11) -BiA	2,10 RAA
1	(12) BeA	11 e-df

It is interesting that Alexander describes step (7) as “obvious.” In the definitional proof it required the application of both (te) and (ek) (see steps (11) through (14) in proof {4}).⁵⁸ Here Alexander ignores these details. They are the groundwork: simply the background of the working syllogistic. Once again, we get a glimpse of how the syllogistic proofs stand in relation to their counterparts.

1.2.4.3 *The proofs of apodeictic Baroco and Bocardo*

We come finally to Alexander’s comments on ecthesis as applied to the moods Baroco and Bocardo containing two apodeictic premisses

⁵⁷ ὑποτεθέντος γὰρ τοῦ τὸ Β τινὶ τῷ Α, τοῦτ’ ἔστι τῷ Γ παντί, ὃ ἐστὶ τι τοῦ Α, καὶ προσληφθείσης προτάσεως τῆς ‘τὸ Α κατὰ παντὸς τοῦ Γ’ οὔσης ἐναργοῦς συνάγεται ἐν τρίτῳ σχήματι τὸ τὸ Α τινὶ τῷ Β ὑπάρχειν, ὃ ἐστὶν ἀδύνατον· ἔκειτο γὰρ μηδενὶ ὑπάρχειν.

⁵⁸ See p. 15.

(and an apodeictic conclusion). To begin with, a simplification. Aristotle remarks at *An.Pr.*30a6–9 that, unlike the other pure apodeictic moods, these two moods cannot be proved in the manner that their assertoric counterparts were proved: they must be proved by ecthesis.⁵⁹ Apart from introducing this requirement, however, the apodeictic character of the relevant propositions does not affect the validation of these moods. So, to make things simpler, in all future comments about these moods we can ignore modal character.

The actual proofs can also be represented fairly simply.⁶⁰ Here, in succession, are the proofs of Baroco and Bocardo:⁶¹

{9}: AaB & AoC \vdash BoC

- | | | |
|-----|---------|--------------|
| 1 | (1) AaB | A |
| 2 | (2) AoC | A |
| 3 | (3) Aeγ | A |
| 3 | (4) γεA | e-conversion |
| 1,3 | (5) γεB | 4,1 Celarent |
| 1,3 | (6) Beγ | e-conversion |
| 1,3 | (7) BoC | 6 TU |
| 1 | (8) BoC | 2,3,7 EE |

{10}: AoC & BaC \vdash AoB

- | | | |
|---|---------|---------------------------------------|
| 1 | (1) AoC | A |
| 2 | (2) BaC | A |
| 3 | (3) Aeγ | A |
| 2 | (4) Baγ | 2 <i>dictum de omni</i> ⁶² |

⁵⁹ See in *A.Pr.*122.19. Assertoric Baroco and Bocardo were proved by employing *reductio ad impossibile*. If, however, the conclusions of apodeictic Baroco and Bocardo are negated in accordance with the *reductio* method, they produce problematic universal affirmatives and the syllogisms that follow would be mixed modal syllogisms, such as Aristotle (at this point in *An.Pr.*) has not yet considered. See Alexander in *A.Pr.*121.4–9; Philoponus, in *A.Pr.*121.5–18; Ross (1949), p. 317; Mignucci (1969), p. 260–2.

⁶⁰ To justify these proofs, however, in an absolutely rigorous fashion, we need (1) to add to {L2} the relevant negative clauses. This would yield {L2*}: ‘If a predicate holds/does not hold of some of a subject, and if it can be shown that a conclusion C follows from the assumption that the predicate holds/does not hold of an arbitrarily selected object within that ‘some’ of the subject, then we know that C holds; for if the predicate holds/does not hold of something of the ‘some’ of the subject and no matter of which it holds/does not hold C holds, then C holds anyway.’ We would also need (2) to justify a special rule which would allow one to go from an e-proposition containing as subject a tied term (see above, note 37) to the corresponding o-proposition containing as subject the term to which the one term is tied. I call this rule ‘TU.’ I discuss this move below.

⁶¹ These proofs are based on in *A.Pr.*121.26–122.7 and 122.7–16 respectively.

⁶² Alexander’s justification for this move is at in *A.Pr.*122.12: εἰ γὰρ τῷ Γ παντὶ ἐξ

2	(5) $\gamma\iota B$	4 a-conversion
2,3	(6) AoB	3,5 Ferio
2	(7) AoB	1,3,6 EE

There is an exceptional and important feature of these proofs of which we must now take note. For some reason, Alexander does not do the obvious thing in, for instance, proof {9}, which would be to use (1) and (3) in order to derive the desired conclusion by Camestres. Instead, he goes through a pair of conversions which make of γ a predicate. (A similar thing occurs in the Bocardo proof.) Within the Aristotelian system this could not be done if γ were a singular, since singulars are not predicated of anything.⁶³ Perhaps with {9} where the conversions are e-conversions, this need not necessarily be so since (it could conceivably be argued) to say that γ does not hold of A is not really to predicate γ of A. But in the Bocardo proof, Alexander converts Bay to $\gamma\iota B$. It is clear in both proofs that Alexander conceives of the ectethen as at least possibly a plural. We might begin to suspect at this point as well that Alexander has a “singular” understanding of how singulars might be employed in logical proof.

1.3 *Interpretation*

1.3.1 *Definitional and perceptual proofs compared*

We come now to the interpretative section proper. And the most obvious of the interpretative questions before us would be, What are the differences between the definitional and the perceptual proofs?

Let us begin by making the only direct comparison available to us: between the two ways of validating e-conversion. A quick look at proofs {4} and {6} reveals great similarity.⁶⁴ Prescinding from trivial divergences of approach, there seem to be no differences at all between the two accounts. But this appearance is deceiving. Of considerable importance is the use in {4} of the expressions $\kappa\alpha\tau\grave{\alpha}$ $\pi\alpha\nu\tau\acute{o}\varsigma$, etc., as opposed to $\lambda\acute{\epsilon}\gamma\epsilon\tau\alpha\iota$ $\kappa\alpha\tau\grave{\alpha}$ (in {6})—or, more precisely, the use of rule (le) in {6} rather than (uk) and (ke). What this shows, I think, is that with the perceptual proof Alexander is uninterested in

$\acute{\alpha}\nu\acute{\alpha}\gamma\chi\eta\varsigma$, καὶ τῷ μέρει αὐτοῦ. It would of course be possible to provide a more rigorous justification of this move, employing rules (et), (ke) and (uk). But again we find Alexander casually presupposing all this in the syllogistic itself.

⁶³ See for instance *An.Pr.*43a25–29.

⁶⁴ See pp. 15 and 19.

proving anything “by means of items already proved and supposed.”⁶⁵ Whereas the definitional proof brings in the *dictum de omni et nullo* as a semantical basis for the syllogistic, the perceptual proof shows no such concern.

Is this an implicit acknowledgement on Alexander’s part that the perceptual proof is less rigorous than the definitional? The mere fact that Alexander includes the definitional proof is suggestive of this. Alexander says that the perceptual proof is “better and most faithful to the text.”⁶⁶ But faithfulness to the text does not constitute logical rigour. If Alexander does not think the definitional proof an improvement in this regard on the perceptual, why does he include it? It certainly looks as if contained in the definitional proof is an implicit criticism of Aristotle. This has a bearing, as we shall see, on Łukasiewicz’s criticisms of Alexander—and we shall return to it.

That what characterizes the perceptual proof is lack of rigour is also shown by attending to clause (7) in the text of the perceptual proof of e-conversion set out above—what we might call ‘text-(7).’⁶⁷ Here we learn that, “C [=α] will be a subpart of both [A and B] and in both [A and B].” This clause contains, in effect, four separate propositions:

(7a) α is ἐν ὅλῳ τῷ A

(7b) α is ἐν ὅλῳ τῷ B

(7c) α is τὶ τοῦ A

(7d) α is τὶ τοῦ B

In proof {6}, we have only drawn out of text-(7) (7a). Indeed, since (7a) plays such a convenient role in {6}—a role, that is, parallel to (12) in proof {4}—, it is difficult to understand why it shows up in the form it does: amalgamated with propositions that have already played their part (at (5), (6) and (iii)).

An answer to this question comes to us when we compare the perceptual proof of e-conversion with the perceptual proof of Darapti. Here is the relevant bit of the latter again:

He does not tell us to take something of S of all of which both P and R are said (if we did that we would gain nothing), but to take something which falls within our perception and which is evidently both in

⁶⁵ in *A.Pr.*32.31–32. See above note 16.

⁶⁶ We might therefore read the καὶ in ἡ ἀμεινόν ἐστι καὶ οἰκειότατον τοῖς λεγομένοις [in *A.Pr.*32.32–33] epexegetically.

⁶⁷ ὥστε τὸ Γ εἶη ἂν ἀμφοτέρων μῶριον καὶ ἀμφοτέροις αὐτοῖς [in *A.Pr.*33.5]. The full text is given above, page 18.

P and in R. For example, suppose that animal is taken for P and holds of every man, which is S, and rational is taken for R and also holds of every man. Then if we take some perceptible item of S—i.e., some man, say Socrates —, then inasmuch as it is evident and perceptible that he is both animal and rational, it becomes obvious that P, i.e., animal, shares in and holds of some R, i.e., rational [*in A.Pr.*99.32–100.7].

There is nothing here about parts being in terms “as in a whole,” etc.: the idea is simply that, when we look at the ectethen, it is obvious that both of the extremes hold of it, so one can serve as the predicate, the other as the subject of the conclusion, since the ectethen (naturally, a subject)⁶⁸ possesses both qualities. The ectethen is a sort of hinge, about which predicates can be turned as required.

In either case then, in either the perceptual proof of e-conversion or Darapti, the governing notion is the perceiving of a selected object and realizing that by means of it the desired proposition is evidently true. The intricacy of proof {6} is not essential to the perceptual method itself. It appears then again that if there is a logically rigorous ecthetic proof in Alexander, it is the definitional proof.

1.3.2 *Alexander the Theophrastan*

We must be wary however of speaking too assuredly in this regard for there are remarks in Alexander where he seems to favour the perceptual proof. Interestingly, these are remarks which show him to be quite open to Theophrastus’s approach.

The remarks I have in mind are found where Alexander treats of e-conversion. The section opens with a remark about Theophrastus. That is, Alexander gives first the Aristotelian lemma, “. . . Now if A holds of no B, B will hold of no A. For if some, e.g., of C, it will not be true that A holds of no B. For C is something of B,”⁶⁹ and then remarks:

⁶⁸ Alexander says that ecthesis is “peculiar” [ιδία, 100.14] to the third figure. He cannot mean here that it *only* occurs in the third figure, for he has already discussed at length its use in e-conversion and he will go on to apply it in a proof of Baroco. The point seems rather to be that ecthesis is especially suited to the third figure, since with it you have a single (perceptible?) subject which serves (as both middle and subject) to bring together two predicates. See also the discussion of *in A.Pr.*100.7–24 below.

⁶⁹ I have expanded the lemma somewhat. The remarks that follow the lemma-break, incidentally, are good evidence that the lemmata as they stand in the Wallies

Theophrastus and Eudemus gave a simpler proof that universal negatives convert from themselves. . . . They conduct their proof in this way: Suppose that A is said of no B. If it is said of no B, then A is disjoined and separated from B. But what is disjoined from something is disjoined from something disjoined from it;⁷⁰ therefore B is disjoined from every A, and if this is so, it is said of none of it [*in A.Pr.*31.4–9].

Alexander immediately remarks that this cannot be what Aristotle had in mind since “Aristotle seems to use a reduction to the impossible to prove this conclusion”; but we should not assume that Alexander repudiates the Theophrastan approach altogether. Following his remark that the proof must be a *reductio* and then his presentation of the definitional and perceptual proofs (both *reductios*, of course), Alexander, as I have said, gives a syllogistic proof of e-conversion (*in A.Pr.*34.8–13). And then he says:

However, a proof through the third figure is untimely here. So, it is better to say that his remarks show that B must be disjoined from A if A is disjoined from B—this is what Theophrastus assumes without proof, as being obvious [*in A.Pr.*34.12–5].

As happens extremely often in this commentary (as we shall see again in chapter 2 particularly), Alexander is here putting forth a Theophrastan position, even while modifying it. At *in A.Pr.*32.32–33.1, i.e., immediately after the definitional proof, we find a remark very similar to the above (and a remark we have already seen): “Or is it better and most⁷¹ faithful to the text to say that the proof proceeds by means of exposition and perception, and not by the method described nor syllogistically?” Why immediately after giving the untenable syllogistic *reductio* proof of e-conversion does he refer to the Theophrastan disjoint method as better—a method from which he has already apparently distanced himself on the grounds that it does not fit the Aristotelian text? Why doesn’t he say here that his own

text (and, of course, some of the MSS) are not Alexander’s. The Theophrastus-Eudemus proof is proposed as an alternative to that found at *An.Pr.*25a16–18, but these lines do not appear in the Wallies lemma. On lemmata in the ancient commentaries, see references at Barnes et al (1991), p. 8, n. 58; also p. 17, n. 85.

⁷⁰ τὸ δὲ ἀπεξευγμένον ἀπεξευγμένον ἀπέζευκται [*in A.Pr.*31.8]. Alexander also quotes this apparent aphorism at *Conv.* p. 65. One would guess that it stems from the school of Theophrastus. See also Philoponus, *in A.Pr.*48.15.

⁷¹ Alexander uses a superlative here: ἡ ἄμεινόν ἐστι καὶ οἰκειότατον . . . (32.32–3). This suggests perhaps that in Alexander’s eyes the Theophrastan proof is to *some* extent faithful to what Aristotle writes.

perceptual *reductio* is better, since this is certainly the upshot of this section in any case?

The source of this difficulty is the unwarranted presupposition that Alexander is being critical here of the Theophrastan proof for any other reason than that it cannot serve as an exegesis of *An.Pr.*25a14–17.⁷² We need not assume in any of this that Theophrastus actually used his disjoint argument to explain *An.Pr.*25a14–17: indeed, we have no independent reason to believe that Theophrastus wrote any commentaries on Aristotle in the later, lemma-by-lemma fashion.⁷³ This leaves open the possibility that Alexander regarded his perceptual proof as a *reductio version* of the Theophrastan proof, applied in this instance directly in commentary on the text. This would explain the second mention of Theophrastus (at *in A.Pr.*34.15): it would be appropriate for Alexander to refer back in these concluding remarks to the proof with which he introduces the section if he regarded it as essentially what he had been expounding throughout the section anyway.

Given then these remarks about Theophrastus and also the comparison (rehearsed above) between the perceptual e-conversion proof and the perceptual Darapti proof (which suggested that the essential thing about both is the visible hinge upon which the predicates turn),

⁷² I should emphasize the word ‘here.’ We shall see below that Alexander is probably critical of perceptual proofs in general; but in this section his point is that they do come closer to what Aristotle says.

⁷³ Pace Geffcken (1932), pp. 406–7. See Barnes et al (1991), p. 5, n. 31. It would seem then that Bochenski has little ground for his guess that it was Theophrastus who criticized Aristotle for using conversion of i-propositions in his proof of e-conversion. Bochenski regards the disjoint argument as proposed in reaction to what Aristotle says at *An.Pr.*25a14–17 (see Bochenski (1947), p. 55 and Barnes et al (1991), 87, n. 19). But it is quite possible that Theophrastus’s writings regarding the *Prior Analytics* were an independent presentation of the syllogistic—in “simpler” terms perhaps. (For some evidence of this, see FHS&G 71A, 72A.) We need not assume that he criticized *An.Pr.*25a14–17 at all. Alexander’s remark at *in A.Pr.*123.18–24 is no counterexample to the present position: ὁ μέντοι Θεόφραστος ἐν τῷ πρώτῳ τῶν αὐτοῦ Προτέρων ἀναλυτικῶν περὶ τούτων λέγων οὐ χρήται τῷ δι’ ἐκθέσεως τρόπῳ πρὸς τὴν δεῖξιν τοῦ συλλογιστικὰς εἶναι τὰς προκειμένας συμπλοκάς, ἀλλ’ ὑπερέθετο τὸν περὶ αὐτῶν λόγον ὡς δεόμενον μὲν τῆς εἰς ἀδύνατον ἀπαγωγῆς μηδέπω δὲ ὄντος προδήλου τοῦ συμβαίνοντος διὰ τὸ μῖξιν γίνεσθαι προτάσεων μηδέπω δ’ εἶναι γνώριμον τὸ ἐκ τῶν μίξεων συναγόμενον. The τούτων in περὶ τούτων λέγων refers not to “these matters”—i.e., any text—but simply to apodeictic Baroco and Bocardo. Indeed, it sounds here (as I suggested above) as if Theophrastus wrote an independent account of the same material discussed in Aristotle’s *An.Pr.* in which, however, he waited until the mixed moods were proved before dealing with these two troublesome ones. Mignucci too, incidentally, suggests that the Theophrastan *reductio* proof spoken of at *in A.Pr.*123.21–4 did not conflict with anything held by Aristotle [Mignucci (1965b), pp. 20–3].

we can conclude with a fair amount of certainty that Alexander regarded his perceptual proof of e-conversion as a Theophrastan—i.e., perceptual—proof.⁷⁴ Moreover, Alexander regarded the perceptual method to be that which Aristotle employed in the relevant text. Whether he thought it absolutely satisfactory as a method of proof is a question to which we shall return to below.

1.3.3 *The role of quantifiers*

Let us now look back to the definitional proof—or, more precisely, to a feature of it which Alexander never really addresses when he presents that proof: why it is that over the course of such a proof one must move out of standard syllogistic language, only to return to it in the end. In other words, what is so special about *κατὰ παντός*, *κατὰ τινός*, etc.? Alexander addresses this issue a bit later in the commentary, at *in A.Pr.*65.16–32.

In this passage, Alexander is commenting on *An.Pr.*26b10–14 where Aristotle shows that the premiss combination ‘AeB & BoC’ is to be rejected as not being syllogistic. Aristotle does this by setting out the terms ‘inanimate,’ ‘man,’ and ‘white.’ He splits the latter term into ‘swan’ and ‘snow’ and then shows that, depending on the referent of BoC—i.e., whether it refers to snow or to swan—inanimate can hold either of all ‘C’ or of no ‘C.’ Thus, there is no necessary conclusion: the combination is inconcludent.⁷⁵

The passage reads as follows:

He does not, as some think, employ a universal negative in setting out the terms, transforming the particular negative of the minor proposition into a universal negative. (Nor, if someone does employ it, should one therefore deem him not to prove the given combination to be non-syllogistic.) For you employ what is universal if you prove ‘of every’ and ‘of none’ for all C rather than for some part of C.

⁷⁴ Interestingly, a late (6th century?) commentary on *An.Pr.* and *Int.* associates the Theophrastan disjoint method with ecthesis. The relevant section is now found at FHS&G 102C; it comes from a commentary edited by Mynas (Paris, 1844), p. 100. See also Mignucci (1965b), p. 18, n. 32; Prantl (1927), v.1, p. 364, n. 45. Mignucci argues that this commentary probably came out of the school of Ammonius: Mignucci (1965b), p. 19, n. 37.

⁷⁵ This notion of non-syllogistic combinations concluding is problematic, and I shall address it in chapter 3. See Barnes et al (1991), pp. 12–13 and Barnes (1990), pp. 58–62. In Alexander, see (among other places) *in A.Pr.*55.21–6, 101.14–16, 328.10–30, and 344.27–31.

Again, if it were not possible to take any parts of the last term of which the middle did not hold universally, then the objectors would be right in objecting to the transformation [μεταλήψει]. This would be the case, if C were indivisible [ἄτομος] and did not have parts. But if it is indivisible, it cannot be true that the middle does not hold of some of it. For if the determinations—namely ‘of every’ and ‘of no’ and ‘of some’ and ‘not of some’—are annexed to the universal, as has been shown in *On Interpretation*, it is clear that the last term is universal and not indivisible; and sometimes there will be not only some thing but some things of which it is predicated, if the middle has been taken not to hold of some of it, as in the examples Aristotle sets down. If it is of this sort, then the exposition [ἔκθεσις—65.30] and the transformation into the universal are correct, and the proof by way of the universal that the given combination is non-syllogistic is sound [*in A.Pr.* 65.16–32].

Let us go through this argument step by step. Says Alexander, “He [Aristotle] does not, as some think, employ a universal negative . . . , transforming the particular negative of the minor proposition into a universal negative.” How might such a proof have gone? Well, after the parenthesis (“Nor, if someone does employ it . . .”), Alexander says: “For you employ what is universal if you prove ‘of every’ and ‘of none’ for all C rather than for some part of C.”⁷⁶ So the proposal, with which in fact Alexander has some sympathy (“Nor, if someone does employ it . . .”), is that ‘AeB & BoC’ should be proved inconcludent by turning BoC into BeC. We would then “deduce” from ‘inanimate holds of no man’ and ‘man holds of no snow,’ ‘inanimate holds of every snow’; and from ‘inanimate holds of no man’ and ‘man holds of no swan,’ ‘inanimate holds of no swan.’ We would thereby prove the inconcludency of the present combination, since a universal affirmative and negative will have been “derived” from the combination.

But what was the objection to this proof method? Alexander writes: “Again, if it were not possible to take any parts of the last term of

⁷⁶ This notion of transforming (μεταλαμβάνων, 65.17) a particular into a universal is found of course elsewhere in Alexander. Besides passages already treated, such as *in A.Pr.* 121.21–22 and 121.30–31, see also 144.28 where he refers to the process of ecthesis as “making” (ποιεῖν) a particular into a universal. In the present passage, Alexander is picking up on his own suggestion (at *in A.Pr.* 64.15–24) that it is “also possible” to prove the combination invalid by means of a particular considered as a universal (ὡς καθόλου ἀποφατική τῇ ἐλάττονι χρωμένους—64.16–17). See Philoponus, *in A.Pr.* 82.21–7 and 82.34–83.4; note also the use of μεταλαμβάνειν at Philoponus, *in A.Pr.* 109.21. On the various meanings of μεταλαμβάνειν in Alexander, see Flannery (1993), p. 210, n. 25.

which the middle did not hold universally, then the objectors would be right in objecting to the transformation. This would be the case, if C were indivisible and did not have parts.” One would have thought that the objection would be to the *μετάληψις* per se: i.e., to the move from particular to universal. This certainly would be the modern objection. But that is not the case here. The objection has to do with the breaking up of the universal. It must have run something like this: ‘Once you turn a part of C into a universal, C itself is seen to have parts. For instance, once you pick out certain white things (such as swans) and speak of these as a class (by referring to “no swans”), C is seen to have parts. But sometimes a universal will not have parts: it could be indivisible. “C,” for instance, might be Socrates. This method of proof therefore lacks generality.’⁷⁷

The question before Alexander then is whether this *μετάληψις* of a particular into a universal is legitimate. Alexander answers that so long as what is “broken up” is known to be a singular (“if it were not possible to take any parts . . .”), it is not. So long, however, as we know it could not be a singular, the process is acceptable. And we *do* know that that which is broken up is not singular. How? “[I]f it is indivisible, it cannot be true that the middle does not hold of some of it.” The middle is, of course, ‘B’ in the combination ‘AeB & BoC.’ Taking the converse of the former statement, we know that

⁷⁷ It is interesting to note in passing that by addressing the question whether a term will necessarily have parts, Alexander is also indirectly addressing a modern problem: whether extensional relations among terms should have a place in the syllogistic. (This problem, indeed, has a bearing on the question whether ecthesis itself is legitimate, since an ectethen is almost invariably taken from within a term and therefore depends on that notion.) Łukasiewicz was opposed to talk of extensional relations in logic. Objecting to Aristotle’s characterization of the first figure (“Whenever three terms are so related to one another that the last is in the middle as in a whole, and the middle is either in, or not in, the first as in a whole . . .” [*An.Pr.*25b32ff]), he writes: “it is not possible to determine extensional relations between variables. It may be said that B is the subject in the first premiss and the predicate in the second, but it cannot be stated that B is contained in A or that it contains C . . .” [Łukasiewicz (1957), p. 29]. A number of commentators since Łukasiewicz however have ignored this stricture, developing close-fitting and logically perfectly respectable models of the syllogistic by employing the notions ‘included in,’ ‘not included in,’ ‘disjoint with,’ etc. (See Corcoran (1974b), pp. 103–104; Smiley (1973), *passim*). There can be little doubt where Alexander would stand on this question: the term ‘man,’ says Alexander, is “in the whole, ‘animal’; that is, it is encompassed by it as in a whole” [*in A.Pr.*25.2–3].

according to Alexander if the middle term applies to the minor term by means of the o-relationship, the minor term cannot represent a singular.

This is obvious enough. But then Alexander says:

For if the determinations—namely ‘of every’ and ‘of no’ and ‘of some’ and ‘not of some’—are annexed to the universal, as has been shown in *On Interpretation*, it is clear that the last term is universal and not indivisible; and sometimes there will be not only some thing but some things of which it is predicated, if the middle has been taken not to hold of some of it, as in the examples Aristotle sets down.⁷⁸

Here the issue is more than the minor term which might be involved in an o-proposition: Alexander is speaking of all categorical propositions, i.e., all those involving the “determinations” (or quantifiers) παντί, μηδενί, τινί and τινί μή. He regards these διορισμοί of the basic categoricals—introduced at *Int.*17a38–18a7—to be decisive, and he believes that Aristotle somehow assimilates or “annexes”⁷⁹ them all to the universal.

What could he mean by this? Does he mean that even particular propositions must refer to a plurality, so that they might be turned into universals—as, for instance, we might move from talk about ‘some of the Joneses’ (meaning the several males in the family) to talk about ‘every male Jones.’ But if this were so, the truth conditions of an i-proposition would not be satisfied in the event that just one individual fell under the proposition’s predicate term. The point rather must be this: that an i-proposition is always *capable* of referring to a plural.⁸⁰ Even should there be just one Navaho in the world, there could be several: “sometimes [sometime?]”⁸¹ there will be not

⁷⁸ εἰ γὰρ οἱ διορισμοί, τὸ παντί καὶ μηδενί καὶ τὸ τινί καὶ τὸ τινί μή, τῷ καθόλου προστίθενται, ὡς ἐν τῷ Περὶ ἑρμηνείας δέδεικται, δῆλον, ὡς καθόλου ἐστὶν ὁ ἔσχατος ὅρος ἀλλ’ οὐχὶ ἄτομος, καὶ ἔξει ποτὲ οὐ μόνον τὶ ἀλλὰ καὶ τινά, ὧν κατηγορεῖται, εἰ τινὶ αὐτῷ εἴληπται μὴ ὑπάρχειν ὁ μέσος, ὥσπερ ἐφ’ οὗ αὐτὸς παρέθετο [*in A.Pr.*65.26–30].

⁷⁹ The word is προστίθενται (65.27). It is not at all clear what it means here, but a parallel passage at *in A.Pr.*100.11–14 helps a good deal: “For in the case of things which are perceptible and one in number [i.e., singulars], neither ‘of every’ nor the determinations in general [ὁ διορισμὸς ὅλως] are appropriate, for the determinations of premisses have their place with universals [ὁ γὰρ διορισμὸς τῶν προτάσεων ἐπὶ τῶν καθόλου χώραν ἔχει], and individuals are not universals.” I take τῷ καθόλου προστίθενται to be roughly synonymous with ἐπὶ τῶν καθόλου χώραν ἔχει.

⁸⁰ For a similar idea in Theophrastus, see FHS&G 82C and 82E and Appendix (pt.1), fragment 1.

⁸¹ The word at 65.28 is ποτὲ. See note 78.

only some thing but some things of which [a term in a particular categorical] is predicated.” Since logic is not about Indians but about the relationships among the terms and concepts used in talking about Indians, one can always turn a particular categorical into a universal and talk about all of that of which it holds, since it is always the case that what falls under a concept can increase in number. In other words, the minor term of the combination under consideration in the above passage can always be considered “a universal” or “as a universal.”⁸²

This applies only while we are within the syllogistic proper. Once we step outside of it and attend to the individuals referred to by the relevant propositions, we are not free to fill in the concepts before us as we will. For instance, once I move from the statement ‘No Greeks are wise,’ to the statement, ‘But Socrates is wise,’ I have moved down to a different tier of discourse. Unless I employ Quinean devices such as ‘x Socratizes,’ the concept ‘Socrates’ cannot be expanded. Once I come back up a tier, however, and refer to Socrates not *as* Socrates but as a (or, better, some) man, I am back at a level where the customary logical manipulations are possible.

The idea is that the quantifiers of the syllogistic pick out sets of contradictories (a- and o-propositions, e- and i-propositions) and since “the negation must deny the same thing as the affirmation affirmed” (*Int.*17b39–40), all the terms that find their way into the square of opposition must be genuine universals: i.e., the terms must refer at least possibly to plurals. This does not mean that singular propositions cannot be parts of contradictory pairs—‘Socrates is sick’ is the true contradictory of ‘Socrates is not sick’;⁸³ but it does mean that these do not interact with categoricals in any straightforward manner.⁸⁴ For a proposition about Socrates to be brought into the syllogistic proper, it has to be translated into a proposition about some man. And at that point, there is nothing essentially singular about the proposition: it is annexed to the universal.

We can conclude therefore the following: that, if a term appears

⁸² ὥς καθόλου ἐστὶν ὁ ἔσχατος ὅρος ἀλλ’ οὐχὶ ἄτομος—in *A.Pr.*65.28. Perhaps the ὥς καθόλου here is an echo of the ὥς καθόλου at *Int.*17b11.

⁸³ *Int.*17b26–30.

⁸⁴ This is recognized in a back-handed way by the treatments of ecthesis which go to such great lengths to overcome the sortal difference between properly categorical (and therefore “syllogistic”) propositions and those containing singulars. See note 37 above.

in one of the four traditional categorical forms (a, e, i, or o), properly speaking it cannot be *conceptually* a singular—and vice-versa. The terms that are used in the syllogistic must refer to kinds rather than individuals. This helps us to understand the structure of the definitional proof ({4}): i.e., why Alexander proceeds so methodically away from and back to characteristically Aristotelian logical expressions (κατὰ παντός, κατὰ τινός, etc.). He is aware of the importance of canonical form in logic and that, as easy as it might be in practice to “take” one of the things of which a term holds, in theory (i.e., logical theory) it is a significant step indeed. It is this awareness that gives to his various ecthetic proofs their resemblance to the modern existential elimination (EE) method. It also explains his elaborate footwork when it comes to dealing with the ectethenta, especially, of the e-conversion proofs.

Finally, this discussion also sheds light on the syllogistic proofs of Baroco and Bocardo (i.e., proofs {9} and {10} above). There we took note of the curious fact that the ectethenta moved into the predicate position when the propositions containing them were converted. We can see now that within syllogistic ecthesis this is not a problem at all. Even if the letter γ were to pick out in these two proofs singulars, they could only be singulars considered *as* a more general type. The γ , that is, might refer to Socrates, but it must do so as a concept: it might pick Socrates out but only as a man. As such, it could also be fitted into a universal and predicated of something more. As long as we are within canonical form, always “the transformation into the universal is correct, and the proof by way of the universal that the given combination is non-syllogistic is sound” [in *A.Pr.*65.30–32].

1.3.4 *Light shed on the Darapti proof*

We are now in a position to understand better a very difficult passage in the section on the validation of Darapti. I am referring to in *A.Pr.*100.7–24.⁸⁵

[A] That proof by exposition is perceptible is indicated first by the fact that, if it is not taken in this way, there will be no proof. Next, there is the fact that in the case of N, which is something of S, Aristotle no

⁸⁵ Notice that for ease of reference I have labelled the paragraphs of the passage [A] and [B] and also interjected some numerals.

longer says that both P and R hold of every N, but simply posits that P and R hold of it. Note also that he does not convert either premiss. For in the case of things that are perceptible and one in number, neither ‘of every’ nor the determinations in general are appropriate; for the determinations of propositions have their place with universals, and the individuals are not universal.

[B] Proof by exposition is peculiar⁸⁶ to the third figure because (1) in this figure there is a single subject for both extremes, and exposition needs to be done from what is both a middle term and a subject. (Some people therefore think that if they take one item which is perceptible, then with respect to this item they will find the predicates either linked with or separated from each other.⁸⁷ If on the other hand <this something> is taken from several subjects, it will be possible for it not to be one thing inasmuch as something different is taken from each—especially if the predicate is predicated affirmatively of one term and negatively of the other.⁸⁸ And in this way there would be no evident and perceptible sharing.) It can also be shown (2) by the fact that everything deduced in this figure is particular; for if you take some one item, i.e., something perceptible, that is sufficient for conclusions of this sort.

⁸⁶ The word is [ιδία, 100.14]. See note 68 above.

⁸⁷ κατὰ τοῦτο ἢ συνημμένα ἢ κεχωρισμένα ἔχειν ἀλλήλων τὰ κατηγορούμενα αὐτοῦ [*in A.Pr.*100.17–18].

⁸⁸ The text is extremely obscure. Here is what Wallies gives: εἰ δ' ἐκ πλείονων ὑποκειμένων λαμβάνοιτο, οὐχ ἓν ἔσται τῷ ἄλλο ἐκ ἐκατέρου λαμβάνεσθαι, μάλιστα ἂν κατὰ μὲν τοῦ ἐτέρου καταφατικῶς κατηγορηται τὸ κατηγορούμενον κατὰ δὲ τοῦ ἐτέρου ἀποφατικῶς. οὕτως δὲ οὐδεμία φανερά κοινωνία καὶ αἰσθητή [*in A.Pr.*100.19–22]. Alexander apparently states that if the subject term of ‘PaN, RaN → PiR’ is drawn from plural subjects, “it will not be one thing, in so far as something different will be taken from each [predicate].” As it stands, the weight of meaning must lie in the “in so far clause,” otherwise the sentence is simply a tautology. But it is the “in so far clause” that brings the difficulty. If this clause means (what is difficult to construe, in any case) that one of the items falling under P and one of the items falling under R are taken even while either item also falls under the other predicate, then the sentence following this one is inexplicable, for it would not be the case that “in this way there would be no evident and perceptible sharing” of the terms: the two predicate terms would have at least two common items. On the other hand, if N is not one in so far as what is taken from one predicate is not part of the other predicate, the first sentence is not true: N could be plural and yet contain items of which both predicates hold. I have proposed in the translation therefore that instead of the above we read, εἰ δ' ἐκ πλείονων ὑποκειμένων λαμβάνοιτο, ἐνέσται οὐχ ἓν εἶναι τῷ ἄλλο ἐκ ἐκατέρου λαμβάνεσθαι: “But if an item is taken from several subjects, it will be possible for it not to be one thing inasmuch as something different is taken from each.” Alexander frequently uses the future of ἔνειμι (plus the infinitive) in the impersonal sense: see *in A.Pr.*390.32; *in Top.* 257.22; *in Metaph.*277.12, 298.28; *Fat.*193.29, 201.7. The loss of ἐν εἶναι from ἐνέσται οὐχ ἓν εἶναι τῷ ἄλλο—giving οὐχ ἓν ἔσται τῷ ἄλλο—is easily explainable as haplography. A scribe may have thought ἐνέσται an inserted correction of ἐν εἶναι and replaced the latter with ἐν ἔσται. The possibility that the two (or more) Ns would not contain an element common to both

First of all, we can say this: the above passage, and especially paragraph [A], establishes the relevance of the passage about the rejected premiss combination ‘AeB & BoC’ to the process of ecthesis.⁸⁹ Once again we encounter the idea that singulars are not appropriately dressed out in “the determinations.”

Secondly, it is clear that Alexander appreciates the idea that the perceptual ecthetic proofs employing singulars might not be fully logical—at least in the sense that they do not mesh well with the (categorical) syllogistic.

But it is interesting to observe Alexander’s careful attitude toward the “some people” of *in A.Pr.*100.17 who seem to have argued for the use of singulars in ecthetic proofs. The phrase ‘some people’ is itself a signal that he does not fully agree with this position; although in his explanation of the second reason for believing that ecthesis is peculiar to the third figure (marked (2) in the quotation), he himself “takes” a perceptible item which is one in number. We do well to tread warily. Alexander would have, of course, no deep-seated aversion to the use of singulars in such proofs: besides his actual use of one in the above passage, his preference in the perceptual proofs for the non-canonical λέγεται κατὰ τοῦ⁹⁰ is evidence of this. And yet he never actually *denies* that the ectethen might be a plural. Perhaps his use of the phrase “some people” is connected with reservations he might have had about the extreme view that the ectethen *must* be singular for the perceptual proof even to work. Could he be holding in reserve the possibility that Aristotle has not stepped beyond the bounds of the logical in proposing his perceptual ecthetic proofs? We shall pursue this question further below.

Finally, we might ask, Who *are* the “some” of *in A.Pr.*100.17?⁹¹ I

P and R is an “unfulfillable” possibility, given that ‘PaN, RaN \rightarrow PiR’ (Aristotle often employs such notions: see for instance *Cael.*271b28–272a7, 279b25–6—see also Hintikka (1973), p. 122); but that is the very point of the objection of the final sentence: “in this way is no evident and perceptible sharing of the terms.” This would especially be the case, say the proponents of this position, if the predicate is predicated affirmatively of one term and negatively of the other, since (as we might interpolate) there could not be a genus-species relationship between the two predicates.

⁸⁹ More precisely, there is a connection between *in A.Pr.*100.7–14 and *in A.Pr.*65.16–32—the passage we have just examined. We might recall also the use of the term ἐκθεσις at *in A.Pr.*65.30. Cp. Barnes et al (1991), p. 130, n. 126.

⁹⁰ Alexander does use the expression ‘Ἄ λέγεται κατὰ τινὸς τοῦ B’ in step (9) proof {6} (and this expression comes close to canonical form), but by the time he does so it is clear he is not speaking in canonical terms.

⁹¹ See Barnes et al (1991), p. 174, n. 37: “Who are these people and what is

would suggest that again Alexander is talking about Theophrastus and Eudemus—and perhaps their followers. First of all, having examined in *A.Pr.*31–34, we know to associate perceptual proofs with this school. Secondly, not only is the subject matter of the present passage similar to the earlier but so is the solution: ἡ συνημμένα ἢ κεχωρισμένα ἔχειν ἀλλήλων (in *A.Pr.*100.18). That is, just as Theophrastus and Eudemus prove the conversion of AeB by simply adverting to the disjunction between A and B, here the “some people” verify all third figure moods by adverting either to the joining or the separation of the two predicates. Lastly, we find here too on Alexander’s part a respectful distance from the Theophrastan position: what we might describe as the favourably-inclined scrutiny of a critical eye.

1.3.5 *Two Łukasiewiczian objections*

We are finally in a position to deal with the two issues raised by Łukasiewicz concerning Alexander’s interpretation of Aristotelian ecthesis. The first has to do with the use of singulars; the second, with the admissibility of supposedly “non-logical” considerations, such as perception, into the syllogistic.

1.3.5.1 *The role of singulars*

As we saw above, Łukasiewicz thinks that he has adequately represented Aristotle’s ecthetic proof of e-conversion by employing his rules (i) and (o) (see proof {2} above, p. 5). The problem with this proof however is that the ectethen in it, despite indications in *An.Pr.*25a14–19 suggesting otherwise, does not appear as a singular but as a full-fledged categorical term: C, in the universal propositions BaC and AaC. This consideration affects Łukasiewicz’s entire treatment of ecthesis, including especially his understanding of its use in the validation of Darapti. Since his position runs clean contrary to Alexander’s perceptual method, he is led to address the ancient commentator’s writings directly.

Łukasiewicz argues that Alexander’s arguments why Aristotle must have had in mind a perceptual proof of Darapti do not hold water.

their view? The style of reference leads us to think that Alexander is mentioning a rival interpretation of exposition [i.e., ecthesis]; but we are unable to find anything here incompatible with what Alexander himself says. (It is possible that Alexander has Boethus in mind: see Themistius, *Max.* 191–2—but the text is obscure.)”

He dismisses the idea, put forward in paragraph [A] above and a bit earlier at *in A.Pr.*99.27–8, that the proof, if it does not employ such singulars, amounts simply to Darapti.⁹² He manages this flank (although only barely) by pointing out that Darapti never appears in his own understanding of the proof.⁹³ As we have seen, however, the difference between Alexander's proof of Darapti (proof {7}) and Łukasiewicz's is that instead of employing EE (or something very like it), Łukasiewicz employs his (i)—or: $(EX)(AaX \ \& \ BaX \leftrightarrow AiB)$. True (i) does not *equal* Darapti but it is very close to it. If, as Łukasiewicz suggests, Aristotle's grasp of what lies behind ecthesis was intuitive and inexplicit,⁹⁴ would he have been able to distinguish the intuitive use of the Łukasiewicz method from the use of Darapti itself?⁹⁵ In other words, Aristotle must have had some grasp of what he was doing in validating Darapti by means of ecthesis; if it was a vague grasp, the vagueness must have consisted in his not realizing that he was not doing what it appeared he was doing (i.e., applying Darapti). But would he not then have adverted to this problem—or avoided the proof by ecthesis altogether? Łukasiewicz's account is, at the very least, psychologically unlikely.

Łukasiewicz also dismisses the notion, put forward by Alexander, again, in paragraph [A], that the absence of a quantifier attached to the ectethen (N at *An.Pr.*28a24–5) has a bearing on the matter. As Łukasiewicz argues, "Aristotle often omits the mark of universal generality where it should be used."⁹⁶ Smith, however, argues persua-

⁹² Łukasiewicz (1957), p. 63.

⁹³ Łukasiewicz (1957), pp. 63–4.

⁹⁴ Łukasiewicz (1957), p. 61.

⁹⁵ Smith argues further that the Łukasiewicz account can offer no explanation of why Aristotle at *An.Pr.*28a25 introduced a fourth term, N [Smith (1982b), p.118]. But this is strange. Łukasiewicz employs a fourth term himself: C, the bound variable in his theses (11) and (12). That Łukasiewicz associated N and C is apparent from the following remark (quoted by Smith): "It is of no consequence, of course, to denote this term [i.e., the "exposed term"] by N rather than by C" [Łukasiewicz (1957), p. 64]. Perhaps Smith would want to say that Łukasiewicz's C is a predicate term and Aristotle's $\lambda\eta\phi\theta\eta\tau\iota\tau\omega\nu\ \Sigma$ [*An.Pr.*28b21] is very strongly suggestive not of a new predicate but of a singular taken out from among the Ss (see above notes 44 and 50). (Smith in fact argues that Łukasiewicz has overlooked Aristotle's $\tau\iota\tau\omega\nu$ [Smith (1982b), pp. 119–121].) I would then agree with Smith that the passage sounds very much as if Aristotle is taking out a singular, but even here the sailing is not clear from the Alexandrian point of view. For, as we have recently seen, Alexander is perfectly willing in syllogistic ecthesis to conceive of the ectethen as a term (or concept). This is why, I believe, Alexander falls back on the argument that Aristotle does not use a quantifier here. See below.

⁹⁶ Łukasiewicz (1957), p. 63.

sively that in *An.Pr.A.1–7* Aristotle is very careful about canonical form: “the only places in which we find ‘belongs’ without ‘to all,’ ‘to some,’ ‘to none,’ or ‘not... to some’ are precisely the ecthetic derivations of Darapti (28a25) and Bocardo (28b21).”⁹⁷

So then, although logically-speaking Łukasiewicz’s account is perfectly acceptable, his arguments against the tenability of Alexander’s perceptual approach are not compelling. And Alexander’s perceptual proof fits *An.Pr.28a23–26* much more closely than that of Łukasiewicz.

1.3.5.2 *The logical status of the perceptual*

The root-cause, however, of Łukasiewicz’s objections to Alexander’s perceptual approach is his contention that the perceptual has no place in logic:

Alexander prefers... another interpretation which is not based on a syllogism: he maintains that the term C is a singular term given by perception, and the proof by exposition consists in a sort of perceptual evidence.⁹⁸ This explanation, however, which is accepted by Maier,⁹⁹ has no support in the text of the *Prior Analytics*: Aristotle does not say that C is an individual term. Moreover, a proof by perception is not a logical proof.¹⁰⁰

There are a number of things to be said about this contention. First of all, if Alexander means by the perceptible, objects in the world or data coming in through the senses, this does indeed offend our common notions regarding what logic is about. But it is quite likely that Łukasiewicz has misinterpreted what Alexander means by ‘perceptual.’ As we have seen, Alexander regards his perceptual proofs as Theophrastan-type proofs in which, typically, one term is *conceived* of as extensionally disjoined from another. This suggests that Alexander’s ectethenta need not be considered extralogical entities at all: he is not necessarily talking about the perception of actual objects or about

⁹⁷ Smith (1982b), p. 119. There are some trivial examples even in *An.Pr.A.1–7* of ὑπάρχειν not being accompanied by a quantifier: see, for instance, 25b4–7 and 26a10 (but also 26a8). In A,9 (at 30a18–9), Aristotle omits the quantifier; but there is an explanation for this: he wishes to refer to a-propositions and i-propositions with one expression and e-propositions and o-propositions with one expression. In general, then, I accept Smith’s point: if Aristotle uses any expression as canonical he uses ὑπάρχειν plus a quantifier in this fashion. It cannot be gainsaid, however, that Aristotle is capable of omitting the quantifiers. Łukasiewicz cites *An.Post.98b5–10* as evidence [Łukasiewicz (1957), p. 63, n. 4; p. 2, n. 1].

⁹⁸ Łukasiewicz cites here in *A.Pr.32.12–21*—i.e., the section on e-conversion.

⁹⁹ Łukasiewicz cites Maier (1900), IIa, p. 20.

¹⁰⁰ Łukasiewicz (1957), p. 60; see also Mignucci (1965a), p. 183, n. 111.

data coming in through the senses.¹⁰¹ Everything that Theophrastus says can be construed as talk about extensional relations among selected terms as depicted in diagrams, such as might employ circles to represent terms (and would therefore be abstractions *from* actual objects or data).¹⁰² A circle (or term) might indeed, according to this conception, contain or exclude another circle (or term). Who are we to say that diagrams are less worthy conveyors of logical ideas than modern notational devices?¹⁰³ It is true, Łukasiewicz also objects even to bringing such extensional considerations into logic; but his position on extensional relations is a vulnerable one.¹⁰⁴ Thus, it is possible for Alexander to have brought perceptible objects into his account without violating our basic intuitions concerning what logic is about.

Secondly, however, there is a sense in which Alexander agrees with Łukasiewicz: a perceptual ectethen does not, even according to Alexander, fit very easily into the syllogistic. It violates canonical form; and, as we saw, Alexander considers this a difficulty.

But what then *was* Alexander's attitude toward his own perceptual proofs? Did he consider them truly probative or somehow deficient? Smith, for instance, thinks he considered them deficient.¹⁰⁵ He offers as proof the very difficult passage in *A.Pr.*122.17–21, in which Alexander is considering the proofs of apodeictic Baroco and Bocardo. He translates as follows:¹⁰⁶

¹⁰¹ On this issue of the nature of perception, see Ross (1949), p. 318; Maier (1900), IIa, p. 101, n. 2, and Smith (1982b), p. 122. In Alexander (*in A.Pr.*) a number of passages are pertinent. At *in A.Pr.*237.11, he uses the expression κατὰ αἴσθησιν to mean simply 'obviously.' At *in A.Pr.*381.5–25, he says that the setting out of terms is not essential to the syllogistic but it helps a learner to comprehend what is *not* perceived [*in A.Pr.*381.18]. (See also on this *in A.Pr.*379.14ff.)

¹⁰² Elsewhere, I have employed such diagrams in an attempt to give an account of the Aristotelian notion of perfect syllogisms [Flannery (1987)]. Mignucci argues that this spatial approach (also associated by Bochenski with Theophrastus [Bochenski (1947), pp. 54–57, 79–81]) is reducible to the notion of a material (as opposed to a formal) identity or distinction among terms, which he in turn regards as a key notion in Aristotle's conception of logic. See Mignucci (1965b), pp. 41–43 and (1965a), pp. 215–233.

¹⁰³ I argue in Flannery (1988) that a three-dimensional approach to logic enables us to avoid some of the traditional paradoxes and anomalies associated with post-Fregean logic.

¹⁰⁴ See note 77 above.

¹⁰⁵ See Smith (1982b), p. 121. Maier too thought perceptual ecthesis less than logically rigorous. He referred to it as "das anschaulichste, aber zugleich das am wenigsten rationelle Verfahren" [Maier (1900), IIb, p. 149; also IIa, p. 101, n. 2]. But compare Maier (1900), IIa, p.20, cited by Łukasiewicz in the above quotation. See also Lee (1984), p. 93, n. 24.

¹⁰⁶ Smith (1982b), p. 121.

... this mode of ecthesis is not like the one he used earlier in the third figure, when his account was about assertoric cases.¹⁰⁷ For there, the thing set out and taken was simply some one of the perceptibles, which need no proof; wherefore it was taken sufficient only for making the consequences evident. Here, however, what is taken is no longer grasped or [seen to] suffice by perception, but rather a syllogism is made about it.

Smith has misinterpreted this passage, I believe. Alexander's point here is not that the ecthetic method used on the third figure assertoric moods was limited in any way ("sufficient *only* for making the consequences evident") but that use of the ectethen was by itself sufficient for Aristotle's purposes in these instances. When he discusses the apodeictic moods, Aristotle uses another type of ectethen (for which the "determinations" 'of every,' etc., *are* appropriate: contrast *in A.Pr.*100.12–13) and constructs a syllogism around this.

The passage (taken a bit beyond what Smith gives) should, I think, be rendered along these lines:

It ought to be noted that this method of ecthesis and that which he mentioned in the third figure, when his concern was assertoric premisses, are not alike. For there the thing set out and assumed was simply one of the perceptible things which do not allow of proof,¹⁰⁸ and therefore it was sufficient merely by being assumed to make the deduction apparent. Here however the thing assumed is not assumed in this way nor does it serve to make things apparent but "with reference to this"¹⁰⁹ he makes a syllogism. And thus here he has appended "with respect to this to make the syllogism"; there, however, he invokes no proof after assuming the ecthesis [*in A.Pr.*122.17–25].¹¹⁰

¹⁰⁷ As Wallies notes, Alexander is referring here to *An.Pr.*28a23 and b14 and 21: Aristotle's mentions of ecthesis as a method for proving Darapti, Disamis and Datisi, and Bocardo.

¹⁰⁸ This phrase (δεομένων δείξεως, 122.19) is a stock one (see *in A.Pr.*23.28, 343.3), a periphrastic equivalent of ἀναπόδεικτος. Just as the word ἀναπόδεικτος came to mean both 'not requiring proof' and 'not capable of proof' [Frede (1974a), p. 128], so it seems from this context that δεομένων δείξεως can bear not only its literal meaning ('not requiring proof') but also the other, 'not capable of proof.'

¹⁰⁹ My inverted commas around 'with reference to this' indicate paraphrase—that is, Alexander's paraphrase by means of πρὸς αὐτὸ [*in A.Pr.*122.22] of the somewhat unusual κατὰ τοῦτου of *An.Pr.*30a10.

¹¹⁰ Alexander is overlooking the proof at *An.Pr.*28a24–26—if indeed it is to be regarded as such. His statement is accurate however with regard to the two other passages: see note 107.

Alexander's concern here is textual: he is not interested in weighing the relative merits of proof methods but primarily in the fact that Aristotle talks about a syllogism at *An.Pr.*30a10.

The next sentence is also telling:

And rightly so, for that would be doing the same thing upon some different subject matter, and that, being equal to and the same as the first, is in no way demonstrative of it [*in A.Pr.*122.25–6].

Alexander's point here is that the perceptual proof serves perfectly well as a proof as it stands: to go on and fit the perceptual ectethen into a syllogistic proof would be to gild the lily. It would be absurd to perform a second proof upon what is already self-apparent.

How is proving syllogistically that which has already been proved perceptually, doing the same thing upon different subject matter? Isn't the subject matter the same in either case? On the contrary: as we have recently seen, even if a singular does find its way into a syllogistic proof, it cannot do so *as* a singular. This notion also comes across in the expression [*in A.Pr.*122.21–22] ἐνταῦθα δὲ τὸ λαμβανόμενον οὐ τοιοῦτον ἔτι λαμβάνεται ("Here however the thing assumed is not assumed in this way").

Smith makes a second related but equally unsustainable claim. Citing the passage given above, he says that Alexander regarded the type of ecthesis applied to apodeictic Baroco and Bocardo "a distinct form of ecthesis from that used in Chs. 2 and 6" (i.e., from that used in e-conversion and the Darapti proof). "This passage," says Smith:

makes it clear that for Alexander only the ecthesis of Ch. 8 is genuinely probative: the other cases all rest somehow on perception and serve only to 'make the consequence evident,' not to prove it rigorously.

But Smith is surely mistaken in this regard: despite what he suggests, *in A.Pr.*122.27–31 says nothing at all about e-conversion (i.e., chapter 2). Alexander says very clearly here that he has in mind Darapti and the other third figure candidates for ecthetic treatment, where the perceptual proof is (as Barnes says) a "redundant cook" anyhow.¹¹¹ The situation with regard to e-conversion is much different. There, as we saw, according to Alexander, Aristotle needs something other

¹¹¹ Barnes adds: "and unfortunately the broth suffers" [!]. This is Barnes translating Patzig: Patzig (1968), p. 157.

than the syllogistic method, since syllogisms have not yet been introduced; so the perceptual proof would not be superfluous. Either it or the definitional proof is required.

Thus, we find ourselves back before the question, What is the significance of the definitional proof? Does it constitute an implicit criticism of Aristotle, insofar as Alexander acknowledges that the perceptual proof is closer to what Aristotle says and yet offers it as an alternative—indeed, as a first alternative?¹¹² Or does Alexander mean to assimilate the perceptual proof and the definitional, as evidence for which we might recall the many resemblances between proofs {4} and {6}?

Unfortunately, I do not think this question can be answered in a ringing and decisive manner. I believe that Alexander had reservations about the perceptual method and that he much preferred, on logical grounds, to work either completely within the syllogistic (which meant for him employing ‘of every,’ ‘of some,’ etc.) or with things openly acknowledged by Aristotle: i.e., “items already proved and supposed.” And yet Alexander would have been able to give a justification for the perceptual approach as well. Making a deduction “apparent,” he might have argued, is an altogether respectable, altogether logical thing to do. Perfect syllogisms, after all, are perfect insofar as their necessity is apparent.¹¹³ Like the definitional proof, then, the perceptual proof reaches down to a level more basic to the syllogistic than the valid moods themselves.¹¹⁴

We can, however, as a conclusion to this section, say a couple of definite things about Łukasiewicz’s two criticisms. First, his argument that Aristotle does not use singulars (which he would associate with the perceptual) is unconvincing. Secondly, his arguments against Alexander concerning the introduction of what is non-logical demonstrate a lack of comprehension of the latter’s (admittedly, extremely elusive) stance in these matters.¹¹⁵ Alexander does not hold the crude perceptual position that Łukasiewicz attributes to him. Moreover, he

¹¹² On Alexander’s criticisms of Aristotle, see Barnes et al (1991), p. 9 n. 60. See also (in the same work) the index of subjects, under ‘Aristotle criticized.’

¹¹³ *An.Pr.*24b24. Alexander holds too that perfection has to do with apparen-
cy: see in *A.Pr.*24.10.

¹¹⁴ It is interesting that Albrecht and Hanisch should argue that ecthesis reveals the grounds of validity: see Albrecht and Hanisch (1970), p. 48. Cf. Mignucci (1965a), p. 220.

¹¹⁵ For another example of Łukasiewicz’s lack of comprehension, see his remark at Łukasiewicz (1957), p. 66: “Here at last [at in *A.Pr.*104.3–7] Alexander concedes that the exposed term may be a universal.” As we saw for instance in proof {7},

seems to have some appreciation of the very considerations that Łukasiewicz raises in objection—insofar, that is, as he recognizes the importance of canonical form. He uses the perceptual method but he certainly doesn't *press* it; and, as he knows, he always has his preferred proof, the definitional, to fall back upon.

1.3.6 *Syllogistic proofs: an inconsistency?*

We come back again to Alexander's treatment of ecthesis as applied to the moods Baroco and Bocardo containing two apodeictic premisses: i.e., 'NAaB & NAoC → NBoC' and 'NAoC & NBaC → NAOB.' Both Alexander's and Aristotle's comments on these moods present a number of difficulties of both a practical and an exegetical nature. It is possible to clear these difficulties away by means especially of ideas presented above concerning the relationship between singulars and their corresponding quantified particular propositions.

Over the course of this chapter, we have adverted occasionally to the question whether an ectethen is a proper or improper part of that from which it is taken. It must be said at this point however that, in a certain sense, it is quite absurd to think of an ectethen as an improper part. Surely the basic notion lying behind the word ἐκθεσις is that something is taken or set *out*: ἐκ-! On the other hand, there are passages in Alexander (and even perhaps in Aristotle) which suggest that an ectethen comprises the whole of that from which it is taken.

At *in A.Pr.*121.28–30, Alexander says that in order to validate Baroco "it is necessary, [Aristotle] says, to take from C that of which A of necessity does not hold, so that it was said of necessity not to hold of some C."¹¹⁶ This sentence reads so tortuously (particularly in Greek) that, taken in isolation, one would suspect textual corruption. But he says much the same thing one page later about Bocardo: "let there be taken again something of C of which part of it A of necessity does not hold, so that it was laid down that of necessity it does not hold of some C—and let this be D."¹¹⁷ The idea apparently is that the ectethen is to be that of which in either mood the predicate of

Alexander has no trouble whatsoever admitting this, provided the proof in question is syllogistic.

¹¹⁶ χρῆναι φησι λαβεῖν ἀπὸ τοῦ Γ τοῦτο, ὅ τὸ Α ἐξ ἀνάγκης μὴ ὑπάρχον ἐλέγετο τινὶ τῷ Γ ἐξ ἀνάγκης μὴ ὑπάρχειν.

¹¹⁷ εἰλήφθω πάλιν τι τοῦ Γ, ὃ μέρει αὐτοῦ μὴ ὑπάρχον τὸ Α ἐξ ἀνάγκης ἔκειτο τινὶ τῷ Γ ἐξ ἀνάγκης μὴ ὑπάρχειν, καὶ ἔστω τὸ Δ [*in A.Pr.*122.9–11].

the o-proposition does not hold. One takes that part of C of none of which A holds—and in virtue of which we say that it does not hold of some C.

On the other hand, however, a few lines before the first of these two remarks Alexander identifies the ectethen as a μόριον—that is, as a subpart.¹¹⁸ Now we might be inclined at this point simply to ignore the fact that μόριον has the literal sense ‘subpart,’ especially since in the second remark (i.e., in *A.Pr.*122.9–11) the ectethen is referred to as a μέρος. Moreover, there are other places in Alexander where the two terms seem to be used interchangeably.¹¹⁹ But we have already mentioned why the notion of “improper” ectethen must prove ultimately unacceptable.

What sense then can we make of the passages in Alexander which suggest that an ectethen might be an improper part? Is he simply being inconsistent—or sloppy? A resolution of these concerns comes by means of an analysis of the Aristotelian passage which occasions Alexander’s remarks. The analysis which I present will be, indeed, the Alexandrian one, as will perhaps become apparent over its course and as I shall establish textually in the following section.

1.3.6.1 *Resolution*

The crucial passage runs as follows:

ἐν δὲ τῷ μέσῳ σχήματι, ὅταν ᾗ τὸ καθόλου καταφατικὸν τὸ δ’ ἐν μέρει στερητικόν, καὶ πάλιν ἐν τῷ τρίτῳ, ὅταν τὸ μὲν καθόλου κατηγορικόν τὸ δ’ ἐν μέρει στερητικόν, οὐχ ὁμοίως ἔσται ἡ ἀπόδειξις, ἀλλ’ ἀνάγκη ἐκθεμένων ᾧ τινὶ ἐκάτερον μὴ ὑπάρχει, κατὰ τοῦτου ποιεῖν τὸν συλλογισμόν· ἔσται γὰρ ἀναγκαῖος ἐπὶ τούτων· εἰ δὲ κατὰ τοῦ ἐκτεθέντος ἔστιν ἀναγκαῖος, καὶ κατ’ ἐκείνου τινός· τὸ γὰρ ἐκτεθὲν ὕπερ ἐκείνῳ τί ἐστιν [*An.Pr.*30a6–13].

There are a couple of preliminary difficulties here which we might address now before moving on to one which Alexander’s understanding of ecthesis especially helps us past. First, in the phrase ἀνάγκη ἐκθεμένων ᾧ τινὶ ἐκάτερον μὴ ὑπάρχει, the ἐκάτερον refers to the predicate term of the o-proposition in either mood.¹²⁰ Secondly, we must be careful in translating ἐκθεμένων ᾧ τινὶ. We should be sure again that our translation relays the idea that that which is taken out by

¹¹⁸ in *A.Pr.*121.26.

¹¹⁹ See above note 45.

¹²⁰ Waitz [*Waitz* (1844), v.1, pp. 394–5] thinks otherwise but Maier argues persuasively against him: see Maier (1900), IIa, p. 106 n. 1.

ecthesis is a proper part of that from which it is taken. That the ectethen is different from that from which it is taken is confirmed by what immediately follows, where Aristotle distinguishes the two: εἰ δὲ κατὰ τοῦ ἐκτεθέντος ἐστὶν ἀναγκαῖος, καὶ κατ' ἐκείνου τινός. So, we should not translate this phrase as, "it is necessary for us to set out that part to which each term does not belong . . .,"¹²¹ but as, "it is necessary for us, having set out something to which each does not belong . . ." (or something similar).¹²² It does not make sense to take out by ecthesis that which is already set before us.

A literal translation of the passage might then run as follows:

In the middle figure however when the universal is affirmative and the particular negative and again in the third when the universal is affirmative and the particular negative, the demonstration will not take the same form; but it is necessary for us, having set out something of which each does not hold, with respect to this to make the syllogism; for <the syllogism> will be necessary using these. If, however, <the syllogism> is necessary with respect to that which was set out, it <will also be necessary> with respect to some of the former. For the ectethen is a particular instance of the former.

The sentence with which one might experience particular difficulty, however, is the final one. We can be certain enough about what Aristotle *means* here. The ectethen is a subpart of that class which is subject of the negative particulars: τὸ γὰρ ἐκτεθὲν ὅπερ ἐκείνὸ τί ἐστίν. We can ascertain this by attending to other passages in the Aristotelian corpus.

Bonitz's index identifies two expressions in Aristotle: (1) ὅπερ on its own (or with, for instance, ἐκείνο), which signifies a substance or, sometimes, something referred to as an essence (τὸ τί ἐστίν); (2) ὅπερ τι (or ὅπερ ἐκείνὸ τι), which signifies something insofar as it is an instance of something else, usually some genus which it instantiates.¹²³ There are also fortunately a couple of passages in which Aristotle

¹²¹ Smith (1989), p. 13. Ross has much the same: "setting out that part of the subject of the particular negative premiss, of which the respective predicate in each of the two cases . . . is not true" [Ross (1949), p. 317].

¹²² The Revised Oxford Translation gives similarly, "by the exposition of a part of the subject, to which in each case the predicate does not belong." Taking the same tack, the Loeb makes the passage less ambiguous than perhaps the Greek will allow: "We must take examples of that portion of its subject to which each predicate does not apply."

¹²³ Bonitz (1870), 533b36–34a23.

actually juxtaposes these two expressions in a way which makes their sense fairly clear. At *An.Post.*83a24–25, he says that the things signifying a substance signify “of what they are predicated of just what is that thing or just what is a particular sort of it”: “Ἐτι τὰ μὲν οὐσίαν σημαίνοντα ὅπερ ἐκεῖνό ἢ ὅπερ ἐκεῖνό τι σημαίνει καθ’ οὗ κατηγορεῖται.”¹²⁴ And at *An.Post.*83b9–10 we see that ὅπερ τι cannot be the same as that of which it is an instantiation. In this section Aristotle is talking about the arrangement of predicates in proper scientific hierarchy, one on top of the other, and he remarks that a genus cannot be predicated of itself: for then “a thing will itself be just what is some of itself”: ὥς μὲν δὴ γένη ἀλλήλων οὐκ ἀντικατηγορηθήσεται· ἔσται γὰρ αὐτὸ ὅπερ αὐτό τι.¹²⁵

But, although this is certainly the idea behind *An.Pr.*30a12–13, it is very difficult to get a handle on how this idea might be contained in the expression ὅπερ ἐκεῖνό τί. How does this expression come to carry the sense we have just established? Given what we know from Bonitz about ὅπερ as signifying essence or (at least) the class within which a thing falls, we can think of ὅπερ as representing a certain sense of the English word ‘something.’ The sense I have in mind is the sense at work in the exchange:

—What is it?

—I don’t know.

—Well, it must be *something*.

Employing this sense of ‘something,’ we might say that Aristotle holds that we can refer to an object as either “something” (ὅπερ)—e.g., ‘man’—or as “some something” (ὅπερ τί)—e.g., ‘some man.’

We are reminded at this point, of course, of the above discussion about the role of quantifiers in Alexander’s understanding of the syllogistic. The idea there was that when we move from talk about a singular to talk about that singular as “some something”—i.e., when we refer to it by means of a phrase employing τὶς—, we move to an expression which represents a concept rather than an individual. This

¹²⁴ Barnes (1975), p. 34. Bonitz says of this passage: “ubi quidem ὅπερ ἐκεῖνο notionem substantialem, ὅπερ ἐκεῖνό τι genus significat, cuius aliqua species (τι) id subjectum est, de quo praedicatur” [Bonitz (1870), 534a7–9].

¹²⁵ The distinction was discussed in the ancient world. In Philoponus [in *An.Post.*240.17–20], for instance, we read: ἐὰν μὲν γὰρ εἶπω ὅτι ὁ Σωκράτης ἀνθρώπος ἐστίν ἢ ζῷον, εἰ μὲν πρὸς τὸν ὁριστικὸν ἀπὶ δὴ λόγον, ὅπερ τὸ κατηγορούμενόν ἐστι, τοῦτό ἐστι καὶ τὸ ὑποκείμενον· εἰ μὲντοι ὥς γένος ἢ εἶδος τὸ κατηγορούμενον θεωρήσω, ὅπερ τι ζῷον ἢ ὅπερ τις ἀνθρώπος ἐστίν ὁ Σωκράτης, ἔχει δέ τινα ἢ λέξις ἀκατάλληλα. See also *schol.*228a20.

is precisely the notion that is contained in the remark τὸ γὰρ ἐκτεθὲν ὅπερ ἐκεῖνο τί ἐστίν [*An.Pr.*30a12–13].

Being absolutely literal, therefore, and now quite perspicuous, we could translate the above remark as, “For the ectethen is some (the former) something” (rather than as above, “For the ectethen is a particular instance of the former”—which is correct but not as informative). Aristotle’s point is that a proof effected upon an ectethen validates the mood in question since the ectethen is used not as a singular but as “some something.” It is used, that is, as a concept and, as such, is identical with the “some” from which it was drawn. If one considers the ectethen as “some something,” it is logically speaking no longer a singular but at least potentially a plural.¹²⁶ It is no longer a perceptible thing in the world but an i-proposition and such, is ‘expandable.’

1.3.6.2 *Some texts in Alexander*

That Alexander espouses the present understanding is shown primarily by the passage which follows immediately upon the passage discussed above in which Alexander states that the type of ecthesis used in the proofs of apodeictic Baroco and Bocardo is not of the perceptual but of the syllogistic variety:

He has also made clear, however, the nature of that which is taken by ecthesis by saying, “For the ectethen is some (the former) something.” For it will be a part or a species of it. Therefore, if of necessity <x holds> of no ectethen, of necessity also <it does> not <hold> of some of the former, from which it was taken. For this is <related> to it as “(the former) something.”¹²⁷

It is clear from what we saw above that we need not conceive of the ectethen in either proof (the perceptual or the syllogistic) as a different thing in each case. It is a matter of using whatever is employed as ectethen, in a perceptual proof as a singular, in a syllogistic proof as a particular (i.e., as appearing in an i- or an o-proposition). Once we

¹²⁶ See *Metaph.*1077b20–22; also, comments at Mignucci (1965a), p.76, are very much consistent with the present approach.

¹²⁷ ἐδήλωσε δὲ καὶ διὰ τοῦ εἰπεῖν τὸ γὰρ ἐκτεθὲν ὅπερ ἐκεῖνο τί ἐστὶ τὴν φύσιν οὐ λαμβανομένου δι’ ἐκθέσεως· μέπος γάρ τι ἢ εἶδος αὐτῷ ἔσται. διὸ εἰ ἐξ ἀνάγκης μηδενὶ τῷ ἐκτεθέντι, ἐξ ἀνάγκης καὶ ἐκεῖνου, ἅφ’ οὗ τοῦτο ἐλήφθη, τινὶ οὐ· τοιοῦτον γὰρ ἐστὶν αὐτοῦ ὥς εἶναι ὅπερ ἐκεῖνο [*in A.Pr.*122.27–31]. (Wallies’ punctuation at 122.27—τὸ γὰρ ἐκτεθέν, ὅπερ ἐκεῖνο, τί ἐστὶ—cannot be sustained.)

do, however, employ the syllogistic method, we have an answer to the metalogical question that arises particularly with regard to apodeictic Baroco and Bocardo. The metalogical question is: What allows one to go from a syllogism about an ectethen to a syllogism involving that “from which” the ectethen was taken and claim that the latter is valid? Using Alexander’s own words, how is it that, “if the proof is sound with regard to a part of C, the proof will also be sound upon ‘some of C’”?¹²⁸ We can provide now a justification for this move by exploiting the fact that the (for instance) “some man” we might employ as an ectethen is employed not as an individual (as Socrates, for instance) but as a man. Considered as a man, Socrates is no different from the subject of a pertinent i-proposition: ‘Some man is such-and-such.’ We did not require this metalogical justification with regard to the perceptual proof of Darapti or e-conversion, for in neither of these is it a matter of going from a syllogism about an ectethen to another syllogism. (This can be verified by examining proof {6} above and in *A.Pr.*99.31–100.7.)

There is also a second “justificatory” idea embedded in the Alexandrian passage just quoted,¹²⁹ although it is quite closely related to the idea we have just talked about. It is contained in the sentence, “Therefore, if of necessity <x holds> of no ectethen, of necessity also <it does> not <hold> of some of the former, from which it was taken.” In the protasis to this sentence, Alexander speaks of a predicate holding of *no* ectethen. He has only, however, used one ectethen in his proof. Obviously, he is presupposing that since the ectethen he used was taken at random from the pertinent class (or subclass), what is proved by means of it applies to all the others that might have (but were not) set out as ectethenta. But this is just {L2^r}.¹³⁰ Like the notion of a singular employed as “some something,” {L2^r} allows us to bridge the gap between an ectethen and that from which it is taken.¹³¹

But does this mean that Alexander offers in the above passage *two* justifications for the characteristic move of apodeictic Baroco and Bocardo? Not at all, for within the EE procedure, as all acknowledge, one selects an arbitrary item from a certain class of such items

¹²⁸ in *A.Pr.*122.15–16. See Ross (1949), p. 318.

¹²⁹ I.e., in *A.Pr.*122.27–31.

¹³⁰ See above, note 60.

¹³¹ Note that Theophrastus too regards a particular—what he calls a “universal *qua* particular”—as picking out “any chance being” [FHS&G 82E].

and treats of it precisely *as* an arbitrary item. This means that one is not permitted to attend to any features that characterize it individually but only to those features which it shares with all others of the larger class. But this just means that we are permitted to attend to the object set out only insofar as it is a particular instance of a class: some something. There is quite a bit of metaphysics presupposed by even the process of logical abstraction.

I might mention finally a second passage in Alexander which testifies to the fact that Alexander thought of ectethenta (at least in syllogistic proofs) as concepts. The passage occurs in his commentary on Aristotle's *Metaphysics*. In the passage he is discussing a sort of ecthesis practised (as Aristotle says) by certain Platonists:

The Platonists also attempted, by using a kind of [method called] 'exposition' [ἐκθέσει τινὶ—124.9], to reduce all things to one and to their proper reality; and their procedure in exposition was as follows. Examining particular men, they would look for the similarity in all of them, and finding this to be one and the same in all men inasmuch as they are men, they reduced all men to this unity, and said that men are men by participation in the one, and this one that is over [particular] men they called man-himself; and they did the same in turn in the case of horses, dogs, and other [animals] [*in Metaph.*124.9–16].¹³²

It is true, Alexander here (and Aristotle at *Metaph.*992b9ff) is rejecting the Platonists' account of ecthesis. But it is clear from the context that what he rejects is not the notion of abstracting from the ectethen a general concept but the notion that this abstracted concept can be considered "a unity and an Idea" on its own: man-himself or animal-itself [*in Metaph.*124.20–23]. Ecthesis itself would seem to be legitimate: i.e., the abstraction of a concept from individuals.¹³³

I adduce this passage not only as evidence for the present argument but also as an indication of where further research in this area might begin. A.C. Lloyd argues that Aristotle conceived of universals (which can in turn be regarded as forms)¹³⁴ as identical with the

¹³² I use here William Dooley's translation: Dooley (1989), pp. 166–7; see especially n. 367.

¹³³ Ross too associates this type of ecthesis with the logical variety: see Ross (1953), v. 1, p. 209. Ross says that ecthesis "seems to be a way of proving, without reference to the ideal theory, that a thing and its essence are one" [Ross (1953), v. 2, p. 179]. Pseudo-Alexander glosses ecthesis as ἐπαγωγή (*in Metaph.*484.10). But see Bonitz (1848–9), *ad loc.*

¹³⁴ See Lloyd (1981), p. 3.

individuals which instantiate them.¹³⁵ He also holds that this understanding is essentially Alexander's. If this is so, there is an obvious connection to be made between Alexander's metaphysical ideas and his conception of ecthesis. But for now, I think, we must leave things rest.

1.4 Conclusion

Let me sum up briefly. The early sections of this chapter were devoted primarily to setting out the most interesting ecthetic (or quasi-ecthetic) proofs in Alexander's commentary on the *Prior Analytics*. One of these, the definitional proof, which probably should not be regarded as ecthetic at all, nonetheless at the beginning occupied much of our time. Not only does a grasp of its structure help us to understand the structure of the properly ecthetic proofs but it also helps us to determine (as best as we are able) the stature Alexander accorded to the two properly ecthetic methods of proof (the perceptual and the syllogistic). I have not been able to make an absolutely clear determination in this regard; but we know now enough, I believe, to call into question some of the standard understandings of Alexander's position.

The other major concern of this chapter has been Alexander's understanding of the relationship of singulars to their corresponding particular categorical propositions. Our best avenue into this issue, it turns out, is a passage not specifically about ecthesis (in the logical sense) but one concerned with the setting out of terms in order to prove a combination of premisses non-syllogistic (i.e., in *A.Pr.*65.16–32). Here we find clear evidence of Alexander's appreciation of the importance of canonical form. We also learn here of the role that singulars (that is, singular propositions and singular terms, such as 'Socrates') might play in the syllogistic. Equipped with these ideas, we are able to understand more adequately, I believe, *An.Pr.*30a6–13, probably the most important text bearing on Aristotle's understanding and use of the method of proof known as ecthesis.

¹³⁵ Lloyd (1981), *passim*.

CHAPTER TWO

THE CONTENTS OF *ON MIXED PREMISSES*

2.1 *Introduction*

The assertoric sector of the *Prior Analytics* (Book A, chapters 1–7) presents a good number of “discussable problems,” such as the one I examined in the previous chapter, the nature of ecthetic proofs; but the problems are all just that: discussable. Commentators over the centuries have earned their livelihood by asking of these pages questions like, ‘Why is only the first figure called “perfect?”’ or ‘Why are there only three figures?’ or ‘Why does Aristotle use ecthesis so reluctantly?’ These are all questions that presuppose that Aristotle’s basic insights were correct: that he got the *logic* right, if not its interpretation or full implications. The same cannot be said with regard to the modal sector (*An.Pr.A*, 8–22). From the very beginning of Aristotelian scholarship—i.e., within the school of Aristotle’s own followers—readers of these later pages have argued that moods Aristotle accepted as valid are not valid and that others he rejected as invalid are valid.

Theophrastus,¹ for instance, Aristotle’s own pupil, apparently rejected his contention that a first figure syllogism containing an assertoric major and apodeictic minor has an assertoric conclusion but that a similar syllogism with apodeictic major and assertoric minor has an apodeictic conclusion. He said that, no, the mode of the conclusion always follows the “weaker” of the two premisses: if there is present a problematic premiss, the conclusion is problematic; failing a problematic, if there is present an assertoric premiss, the conclusion is assertoric. Only where both premisses are apodeictic can the conclusion be apodeictic.² I will refer to this doctrine that the

¹ For the relationship between Theophrastus and Eudemus, see chapter 1, note 8. In subsequent remarks, I shall call into question the standard interpretation of Theophrastus’s attitude toward these Aristotelian moods. Until I get to that argument, however, when I speak of Theophrastus’s position in this particular regard, I mean to pick out this standard interpretation. The same is true for the corresponding Aristotelian position, which I shall argue may also have been misinterpreted.

² See in *A.Pr.* 124.8–125.2. For a recent treatment of this issue, see Patterson (1989).

modality of the conclusion must follow the lesser premiss as the ‘peiolem rule,’ after the medieval phrase, *peiolem semper conclusio sequitur partem*: ‘the conclusion always follows the lesser part.’³ I shall call the corresponding Aristotelian doctrine the ‘anti-peiolem rule.’ Sometimes I shall use ‘peiolem’ or ‘anti-peiolem’ as tags, in expressions such as ‘the peiolem conclusion’ or ‘the anti-peiolem premisses.’

Theophrastus’s arguments for his own way of seeing things are strong. According to Alexander, he argued for the peiolem rule in much the same way as (in our previous chapter) he argued for the conversion of e-propositions: i.e., by means of the notion of being “disjoined” (ἀποξενγνύναι).⁴ Consider the syllogism ‘NAaB & BaC → NAaC.’⁵ If B holds only assertorically of C, then it can be disjoined from it. But when this is the case, A is also disjoined from C. But this could not happen if A held of necessity of every C (‘NAaC’). He also adduced terms (or “matter”) in disproof of Aristotle’s contention. For A understand ‘animal’; for B, ‘man’; for C, ‘moving thing.’ ‘Animal’ holds necessarily of ‘man’; let’s say man holds of everything that moves; we can conclude that ‘animal’ holds of every moving thing—but it is not the case that it holds necessarily, since ‘man’ (and therefore animal) can be separated from ‘moving thing.’ Similar results, he apparently said, can be obtained using the terms science/grammatical/man or moving/walking/man.⁶ These apparently anti-Aristotelian arguments will play a large part in the present chapter. I shall refer to them in a collective way as ‘the Theophrastan problem.’

Despite his (in many respects) justly acquired reputation as an intransigent defender of Aristotelian doctrine, Alexander adds to the above objections a list of related problems encountered when one tinkers for a while in the modal syllogistic with the tools that Aristotle himself has provides.⁷ How then does Alexander solve this difficulty?

³ See Alexander, in *A.Pr.*124.12–13; Philoponus, in *A.Pr.*126.2–6; FHS&G 105, 106H; Kneale and Kneale (1962), pp. 102–105; Barnes (1975), p. 113. Compare *An.Pr.*30a15–17.

⁴ Compare in *A.Pr.*34.14 and 124.19–20.

⁵ For these symbols, see Appendix (“Logical Symbols and Conventions”).

⁶ in *A.Pr.*124.21–30. It is quite possible that these latter sets of terms originate not with Theophrastus and Eudemus but with Alexander, i.e., that he adds them as more suitable counterexamples. He does that sort of thing frequently (see Barnes et al (1991), pp. 8–9).

⁷ For example, at in *A.Pr.*213.11–27 he proves that the combinations ‘NAeB & M²BaC’ and ‘NAeB & M²BiC’ can both conclude with necessary propositions (an e- and an o-proposition, respectively). (See also in *A.Pr.*249.16ff.) At in *A.Pr.*214.12–18,

How does he deal with the fact that, apparently, in the modal syllogistic his master has slipped—and slipped repeatedly? That is not at all easy to say, since, rather than become sidetracked by this issue, when he comes to a place in his commentary where his own calculations cause him to diverge from what Aristotle says, Alexander almost invariably refers his reader to a work, written by him, which is now perished: what I (following Alexander's own abbreviation) shall call *On mixed premisses* (Περὶ μίξεων).⁸ It will be my task in this chapter to try to reconstruct the contents of this work, that we might better understand Alexander's modal logic, which (as is little realized nowadays) went far beyond Aristotle's own in sophistication.

This task can be accomplished, to a fairly satisfactory extent, by examining: 1) remarks in *in A.Pr.*; 2) a possible fragment of *On mixed premisses* itself—which, in any case, certainly gives otherwise unknown information about Alexander's modal logic; 3) testimony that survives in the commentary on *An.Pr.* by John Philoponus; 4) testimony (also regarding *An.Pr.*) that survives under the name "Pseudo-Ammonius"; 5) a few remarks on Alexander's understanding of ne-

he proves that the combination 'NAaB & MBiC' can give, as well as a problematic conclusion, an assertoric one. As he says, "[Aristotle], however, says that the conclusion in the present combination is not assertoric" (*in A.Pr.*214.17–18; the Aristotelian remark is at *An.Pr.*36b1–2). At *in A.Pr.*236.8–11 he shows that, although a possible-2 (M²AeB) conclusion to the premisses 'NAeB & M²AaC' cannot be validated since possible-2 e-propositions do not convert (as Aristotle argues and as Alexander notes with regard to this mood), still, from a possible-2 negative universal you can derive a possible-2 negative particular, which itself converts to a possible-2 affirmative particular, which on conversion would give a conclusion with terms in the proper order. At *in A.Pr.*238.22–38, despite Aristotle's claim that the moods are not derivable, he proves 'NAaB & M²AeC → M¹BeC' and 'M²AeB & NAaC → M¹BeC.' At *in A.Pr.*240.4–11 he proves 'NAaB & M²AaC → M¹BeC' by "complementarily converting" the minor. (See Ross (1949), pp. 296–98; McCall (1963), p. 71.) And at *in A.Pr.*240.32–241.9, using similar methods, he proves 'NAaB & M²AoC → M¹BoC' and 'NAaB & M²AiC → M¹BoC.' For other such apparent criticism by Alexander of Aristotle's modal syllogistic see *in A.Pr.*249.25–32 and 270.6–8. See also Barnes et al (1991), pp. 7–11. I am not however certain that the above extra moods might not be capable of being accounted for in a way which shows that Aristotle did not mean to exclude them or in a way that shows that, given the right presuppositions, they will not be derived.

⁸ John Philoponus calls this work a μονόβιβλον [see his *in A.Pr.*126.21], so it could not have been a terribly long work. Alexander referred to it in fuller fashion as Περὶ τῆς κατὰ τὰς μίξεις διαφορᾶς Ἀριστοτέλους τε καὶ τῶν ἐταίρων αὐτοῦ (*in A.Pr.*125.30–1)—i.e., "Concerning the difference between Aristotle and his followers regarding mixes" (i.e., syllogisms of mixed modality) and Περὶ τῆς κατὰ τὰς μίξεις διαφωνίας Ἀριστοτέλους τε καὶ τῶν ἐταίρων αὐτοῦ ("Concerning the disharmony of . . ."—249.38–250.1). The difference between these two forms of the title is insignificant (see Volait (1907), p. 84, n. 1). For Alexander's use of the abbreviation Περὶ μίξεων, see *in*

cessity found in two works by al-Fārābī on Aristotle's *De Interpretatione*; 6) remarks that survive in the works of Averroes, who draws on a tradition (including al-Fārābī) that was familiar with *On mixed premisses*.

The sources are listed here roughly in order of descending value—although none of them, obviously, is absolutely without value. The first two must be regarded as the most authoritative. With regard to the next two, it is unlikely that either Philoponus or pseudo-Ammonius had direct access to *On mixed premisses*. Their comments are very interesting, but are fraught with interpretive problems (which will occupy us at length). Finally, the distance between the Arab logicians and Alexander is even greater than with Philoponus and pseudo-Ammonius. Averroes (1126–1198 A.D.), although quite expansive on topics which touch upon what we know to have been the contents of *On mixed premisses*, did not have access to the work and received his information from a hostile source⁹—i.e., Themistius (317–388 A.D.), whose writings in this connection do not survive. Al-Fārābī (c.873–950 A.D.) appears also to be in possession of second-hand information.¹⁰

A.Pr. 207.35–6, 213.26–7, 238.37–8. For other mentions (or possible mentions) of *On mixed premisses* in *in A.Pr.*, see 70.20, 110.20, 127.16, 188.16, 191.17, 193.21, 284.17, 328.6, and 390.9. He also speaks at 250.2 (in conjunction with mention of *Περὶ μίξεων*) of some work he had done previously ἐν τοῖς Σχολίοις τοῖς λογικοῖς—also perished. For this see Sharples (1987), p. 1196. Zeller suggests that the mention here of scholia is a later gloss; but he offers no evidence for this, and Alexander's words (in full: ἐπὶ πλεόν εἴρηται περὶ αὐτοῦ μοι ἐν τοῖς Σχολίοις τοῖς λογικοῖς—250.1–2), which are quoted by Zeller, suggest otherwise [Zeller (1923), p. 820, n. 2].

⁹ See Averroes, *Questions* 4, p. 114 [FHS&G 98B]. That Themistius was not favourably inclined toward Alexander we know from {Ammonius}, *in A.Pr.* 39.2. See also Averroes, *Middle Commentary*, p. 200.15–22 [FHS&G 98G] and Rose (1867), p. 207.

¹⁰ Rose [Rose (1867), p. 206] says that the frequent mention of Themistius in Averroes' *Questions* and commentary on *An.Pr.* shows that Themistius (and not Alexander) was the source for his historical data. He says too that al-Fārābī probably had Themistius in his hands (i.e., his lost commentary on *An.Pr.*). Dunlop [Dunlop (1962), p. 24] agrees that Averroes knew Alexander through Themistius and says that the work of Themistius that Averroes knew was the commentary on *An.Pr.* spoken of in the *Fihrist* (ed. Cairo, 1384 A.H. 384). Maiolus cites Themistius's commentary on *An.Pr.* by chapter [Maiolus (1497b), d.4.v], so it appears that the work survived until quite late. I suspect that, since Averroes complains with regard to crucial points that his source for Alexander's position is unreliable because hostile (see n. 9), al-Fārābī knew *On mixed premisses* only from what he learned through Themistius. Otherwise, Averroes would have had what he could have regarded as untainted testimony. One of the main works in which al-Fārābī would have discussed *On mixed premisses*—i.e., his "Middle Commentary"—has perished. (I rely here on Peters who says that al-Fārābī's Middle Commentary on *An.Pr.* has "disappeared without a trace" [Peters (1968a), p. 16].) Fragments of the Great Commentary sur-

A number of things must be stated at the outset especially about the use of Arabic sources in this chapter. First of all, the present writer has no Arabic, which has set a severe limit on the original research he could do in Arabic sources. In his early research he relied on Latin, English and German translations, not always based on the best manuscript traditions (particularly the Latin translations). Since then, however, he has had the help of a number of Arabists in verifying and correcting translations from the Arabic.¹¹ Secondly, many texts which doubtless will turn out to shed light on the nature of *On mixed premisses* have not yet been edited—or even, perhaps, discovered.¹² Thirdly, Arabic logic has not received much modern attention, although scholars such as Badawī, Dunlop, Gutas, Rescher and Zimmermann, have made a noble beginning. We can certainly expect systematic work in the history of Arabic logic to provide more precise information concerning *On mixed premisses*.

Thus, the use to be made here especially of the Arabs must be considered unfinished work. It might be useful to think of the present chapter as a sort of hand-held fan. The parts of the fan near the handle—the Greek sources—are relatively controllable and sturdy. As we move out into the Arabic world, control of the sources becomes more uncertain—as do the sources themselves. Despite this situation, however, it seems worthwhile bringing in the Arabic sources. Not only do we find there the possible fragment mentioned above but a consideration of these sources (within the context of an analysis of the more wieldy Greek sources) will give us hints as to what to look for in the future among the Arabs.¹³

vive in Maimonides, from whom we learn that this work was especially concerned with modality [Steinschneider (1869), pp. 31–37]. Maimonides also mentions that al-Fārābī began this commentary with a polemic against Galen [Steinschneider (1869), p. 32]. We shall see below that this itself might indicate a connection with *On mixed premisses*.

¹¹ The publication of *Theophrastus: Sources for His Life, Writings, Thought and Influence* by William Fortenbaugh, Pamela M. Huby, Robert W. Sharples and Dimitri Gutas was also an enormous boon. Almost all of the Arabic passages which affect the present argument are found there, including Arabic critical texts and English translations by Gutas.

¹² Rescher [Rescher (1967), p. 46] speaks of the “casual conditions which prevailed at the Escorial for many years.” This is where many of the most important Arabic manuscripts devoted to logic are kept—and where the above-mentioned (supposed) fragment was found. It is not inconceivable that an Arabic translation of *On mixed premisses* might some day turn up there (or elsewhere).

¹³ As we shall see also, the Latin translations are valuable sources of information in their own right, for they contain information apparently not preserved elsewhere.

My method of proceeding will be as follows. First of all, I examine a section in Philoponus's *in A.Pr.* in which he actually mentions *On mixed premisses*. When attention in the current literature has turned to *On mixed premisses*, this passage from Philoponus has received more attention than any other passage in the ancient commentators (including Alexander); and thus I turn to it first. The exposition in this first section will be somewhat plodding and disjointed: a list of facts, with a minimum of commentary. It is only eventually (once we examine the other sources) that the connections among the many factors involved will emerge.

Secondly, I examine the fairly similar passage in pseudo-Ammonius, comparing it to (and contrasting it with) the Philoponus passage. I also focus in on a pair of passages in which pseudo-Ammonius and Philoponus treat a single issue in significantly different ways. This leads me to draw some fairly important conclusions about (among other things) Alexander's style of treatment in *On mixed premisses*.

After that I return to a question which arises originally in consideration of the Philoponus passage: Alexander's attitude toward hypothetical necessity. It is here also that I begin to bring in our most authoritative source, Alexander's own *in A.Pr.*—in particular *in A.Pr.* 140.14–141.16—which I relate especially to the pseudo-Ammonius passage (but also the Philoponus passage). (Paul Moraux's analysis also becomes particularly important in this general section.) Then, before examining the Arabic sources, I look at Alexander's *in A.Pr.* 129–30 where I find a (rather surprising) way of treating the Theophrastan problem which helps to make sense of *in A.Pr.* 140–1.

In the section on the Arabic sources, I begin with the writings of Averroes. I make use especially of the fourth of his logical *Questions*, the one devoted to the nature of assertoric propositions.¹⁴ This pro-

¹⁴ I have had access to four different translations of this work (i.e., *Questions* 4): two in Latin [(Balmes), *Quaesita lib.pr.*, pp. 78D–80F], [(Elia), *Quaesita lib.pr.*, pp.a.1.r-a.4.r], two in English [Rescher (1963a), pp. 94–105], [FHS&G 98B]. Where possible, however, I use the (partial) translation by Gutas [FHS&G 98B]. (And in general I use translations by Gutas whenever possible.)

There are at least two Arabic manuscripts of the *Questions*, known in Arabic as *Masā'il*: one in the Escorial Library (near Madrid), another in the Biblioteca Nacional (Madrid). The Arabic text has been edited by 'Alawi; D.M. Dunlop has published an edition of question 4 [Dunlop (1962)]. Dunlop (p. 23) gives detailed information concerning the manuscripts; his footnotes (p. 25) also constitute a very useful bibliography. I use in the present work the numbering of the 'Alawi edition.

What follows is a concordance of the *Questions* as they appear in the 'Alawi edition and in the (widely available) Juntine Latin edition of Aristotle [= (Balmes), *Quaesita lib.pr.*]. (This translation of the *Questions* is, however, not to be relied upon:

vides us with interesting information pertaining especially to Theophrastus, information that is consistent with previously-considered passages both in Philoponus and in Alexander.

That will bring us to Alexander's understanding of necessity in general (including, of course, hypothetical necessity). This is also where the possible fragment from *On mixed premisses* figures in. It allows us (or so I believe) to corroborate much of the evidence found elsewhere, particularly in the Greek sources. We finish where we began: with a final assessment of Philoponus's understanding of *On mixed premisses*.

2.2 What Philoponus says about *On mixed premisses*

So then, Philoponus mentions in the pertinent passage in his commentary on the *Prior Analytics* that there was a good deal of debate about Aristotle's claims with regard to mixed, assertoric-apodeictic syllogisms.

see Rescher (1963a), p. 91, n. 5 and Dunlop (1962), p. 24.)

# Balmes	pp. Balmes	# 'Alawī	pp. 'Alawī
I	77I–78C	1	97–99
II	78D–80F	4	114–122
III	80G–81I	2	100–105
IV	81I–87F	7	152–175
V	87G–89B	3	106–113
VI	89C–92D	6	139–151
VII	92D–98E	9	187–207
VIII	98F–100F	missing	

There also appears in the Balmes translation a (separately numbered) question on *Int.*, entitled “De Predicatis compositis et divisis.” This appears in ‘Alawī at pp. 87–94. ‘Alawī has other questions which do not appear in Balmes: i.e., questions 5 and 8 (see FHS&G 98C, 105, 106I).

It should be noted that there are a number of internal discrepancies between the Elia and Balmes versions: compare, for instance, 82I and a.8.v, 83K and b.1.v, 84K and b.3.r. These discrepancies, all instances where Balmes has more material than Elia, do not look like interpolations. On the other hand, the Balmes and Elia versions agree in giving at least one sentence that does not appear in Rescher: (Balmes, 78L) “Ac etiam exemplum illius, quod tulit . . .”; (Elia, a.2.r) “& etiam exempla eius quae fecit . . .” This all suggests that there existed several versions of the *Questions*, possibly representing reworkings by Averroes himself. The Latin versions then are quite likely to be valuable sources in their own right. Dunlop says of *Masāʾil* that “it is probable that it is a collection of the replies of Averroes to actual questions put to him, rather than, for example, memoranda on difficult points for his own use” [Dunlop (1962) p. 23]. Perhaps this accounts for the many variations. Elia's translation is certainly from a Hebrew version of the *Questions* (see d.7.v). Dunlop (citing Steinschneider) suggests that the Balmes version is also from a Hebrew version [Dunlop (1962), p. 24]. (For biographical information pertaining to Elia, see especially Dukas (1876), pp. 25–77 and Dunlop (1962), p. 24.)

On one side there were ranged Theophrastus and Eudemus “and also the Platonists”;¹⁵ but there were also those who “joined ranks with the philosopher.”¹⁶ The mere fact that Philoponus mentions these joined ranks is significant, as we shall see. Very often in the literature, when mention is made of either *On mixed premisses* or matters pertinent thereto, we hear talk of the make-up of the different sides in the debate. I shall conclude from this that there is good reason to believe that Alexander approached the problems of *On mixed premisses* by setting out (in good Aristotelian fashion) the opinions of his predecessors. Indeed, this aspect must have been especially prominent for it to be mentioned so often in the tradition to which it gave rise.

Philoponus decides to treat of the arguments in favour of the Aristotelian position first, beginning with Aristotle’s own argument, based on the *dictum de omni et nullo*.¹⁷ Then he gives two arguments put forward by Aristotle’s allies. The first is a *reductio* argument, which makes use of the mood ‘MAoC & BaC → AoB.’¹⁸ The second is quite a ridiculous one; it argues that, since with ‘NAaB & BaC,’ as opposed to ‘AaB & BaC,’ we have an apodeictic premiss, the conclusion to the former must be ‘NAaC.’

Philoponus moves on then to Theophrastus and company. They brought against Aristotle, he says, the “significations” (σημασίας—124.11) of the words ‘necessary’ and ‘assertoric.’ “The necessary is that which holds of all and eternally [παντι καὶ αἰεὶ—124.11]; the

¹⁵ οἱ δὲ ἐταῖροι αὐτοῦ οἱ περὶ Θεόφραστον καὶ Εὐδήμον καὶ ἔτι οἱ ἀπὸ Πλάτωνος—Philoponus, in *A.Pr.*123.15–6. It is interesting that the mention of Platonists siding with Theophrastus and Eudemus in these matters recurs in much of the tradition: see, for instance, {Ammonius}, in *A.Pr.*39.2, who adds the names of some neo-Platonists who took the same side, i.e., Themistius, Syrianus, Proclus. See too Averroes (Elia), *Quaesita lib.pr.*, a.1.r, which does not have the error at Averroes (Balmes), *Quaesita lib.pr.*, p. 78DE. (Cp.FHS&G 98B; see to Rescher (1963a), p. 95, n. 17.) Al-Fārābī, while discussing the *peiorum* rule in his “The harmony between Plato and Aristotle,” also mentions Themistius, “Ammonius” (he apparently believed this to be Ammonius Saccas) and Alexander [Dieterici (1892), pp. 16–18]. He describes in detail how the Platonists attempted to argue that Plato in the *Timaeus* had maintained the *peiorum* rule. (Compare Albinus, *didask.*, pp. 158–60.) See also Maiolus (1497a), e.4.r (and below, footnote 28); Rose (1867), pp. 206–9, and Zimmermann (1981), p. xcvi, n. 1.

¹⁶ οἱ τῷ φιλοσόφῳ συνηγοροῦντες—123.18.

¹⁷ Philoponus, in *A.Pr.*123.21–26; see also *An.Pr.*30a22.

¹⁸ To which mood Philoponus calls special attention (ιστέον—124.1). It is not a standard Aristotelian mood, suggesting that it appeared in a work on Aristotle’s logic which was not a line-by-line commentary on the *Prior Analytics*. See chapter 1, note 73.

assertoric, that which is in the subject [ἐν τῷ πράγματι—124.12]¹⁹ but could be taken away from it [δύναται δὲ καὶ ἀπογενέσθαι αὐτοῦ—124.12].”

Having made this point, he then (at Philoponus, *in A.Pr.*124.16–24) explains it. I paraphrase, so that I can interject some clarifying elements:

The mistake is in assuming that all parts of something are genuine parts.²⁰ Bearing in mind the proposed syllogism ‘NAaB & BaC → ?AaC,’ if when we say that B holds of every C, we are speaking of things like ‘animal’ (B) and ‘man’ (C), then, if A (e.g., ‘physical object’) holds necessarily of B, ‘physical object’ will hold necessarily of ‘man.’ But the terms B and C do not always correspond to such things. ‘BaC’ represents an assertoric proposition, according to whose nature B might hold sometimes and sometimes not hold (or, as Theophrastus has said earlier, it can be disjoined from it). If therefore it is possible for C not to be a part of B, the conclusion derived from ‘NAaB & BaC’ will not be NAaC but AaC.²¹

This is an important argument. We shall find this approach to the peiorem rule made more explicit and distinct in our other sources.

At this point (*in A.Pr.*124.24), Philoponus moves beyond considerations associated with the disjoint argument and says that Theophrastus and company also propose a disproof of ‘NAaB & BaC → NAaC’ by adduction of terms (as Alexander had also mentioned—see above). He gives two sets of terms: motion/walking/man; virtue/prudence/man.²² He presents a couple of other arguments, on both sides of the question, after which he gives a formulation of the peiorem rule.

But then, at *in A.Pr.*126.7–29, comes one of the most important statements pertaining to *On mixed premisses* that survives. I give a translation in full:

¹⁹ For the meaning of *πρᾶγμα*, see Lee (1984), p. 42, n. 33; also Barnes (1990), pp. 41–2.

²⁰ τοῖς . . . κυρίως . . . μέρεσιν [Philoponus, *in A.Pr.*124.18–19]. I could perhaps more felicitously translate this ‘proper parts’ but that expression is heavily laden nowadays with other logical connotations.

²¹ . . . κακῶς ὑπέθεσθε, φασίν, ὅτι εἰ τὸ A ἐξ ἀνάγκης παντὶ τῷ B ὑπάρχει, μέρος δὲ τοῦ B τὸ Γ, τὸ ἄρα A ἐξ ἀνάγκης παντὶ τῷ Γ ὑπάρξει· τοῖς μὲν γὰρ κυρίως αὐτοῦ μέρεσιν ἐξ ἀνάγκης ὑπάρχεις ὑπάρχει πᾶσιν, οὐ μέντοι γε τοῖς ποτὲ μὲν οὖσιν αὐτοῦ μέρεσι ποτὲ δὲ μή. τὸ δὲ B τῷ Γ παντὶ μὲν ὑπῆρχεν, οὐκ ἐξ ἀνάγκης δέ, ὥστε δύναται καὶ μὴ ὑπάρχειν· αὕτη γὰρ ἡ τοῦ ὑπάρχοντος φύσις, τὸ ὑπάρχον μὲν δυνάμενον δὲ καὶ μὴ ὑπάρχειν. εἰ τοίνυν δυνατόν τὸ Γ τοῦ B μὴ εἶναι μέρος (οὕτω γὰρ ἐδείχθη), πρόδηλον ὅτι οὐκ ἐξ ἀνάγκης παντὶ τῷ Γ ὑπάρξει [*in A.Pr.*124.16–24].

²² We might notice that neither of these sets is identical with those that Alexander gives at *in A.Pr.*124.21–30 (although the first is close to Alexander’s second set). I mention this now because the actual choice of terms becomes an important issue below.

“So, what? Is no help to be devised for Aristotle’s argument? We say that it is possible. For he <Aristotle> says in *On Interpretation* that ‘necessity’ has two senses: the proper sense and the hypothetical sense [τὸ μὲν κυρίως τὸ δὲ ἐξ ὑποθέσεως—126.9]. And the hypothetical has <in turn> /10/ two senses: the necessity which is spoken of while the subject holds²³ and that which is spoken of while the predicate holds. For instance, ‘the sun is in motion’ is said to be properly necessary; ‘Socrates is an animal,’ however, is hypothetically necessary “while the subject holds.” For while Socrates is, it is necessary for him to be an animal—which also comes closer to the proper sense of necessity. /15/ The third sense is involved when we say, for instance, that necessarily the sitting man sits. For while the predicate holds—I mean, that is, ‘sits’—necessarily it holds of the sitting man, with hypothetical necessity. We say therefore that the major premiss has been taken as involving proper necessity, the conclusion, however, as involving hypothetical necessity—“while the predicate holds.” /20/ For *while* A holds of C, it holds of it necessarily.

And Alexander, the expositor of the Philosopher, says in a certain monograph that his teacher Sosigenes was also of this opinion,²⁴ i.e., that²⁵ Aristotle derives hypothetical necessity here. For, that this, he says, is what he meant is clear from the fact that when, on the one hand, he derives an assertoric conclusion /25/ (the major being assertoric, the other premiss being apodeictic), the Philosopher sets out terms. On the other hand, when, the major being apodeictic and the minor assertoric, he derives a necessary conclusion, he has not had terms to set out deriving necessity proper—from which it is clear, he says, that Aristotle assumed hypothetical necessity.

We might call attention to a number of details in this passage. First of all, according to the easiest (but not the only) reading of the Greek corresponding to the last paragraph, the subject “he” throughout is Alexander (i.e., except where ‘he’ refers to Aristotle). He is mentioned as the subject of φησιν at 126.21; there is no indication that

²³ I translate ἔστ’ ἂν ὑπάρχῃ τὸ ὑποκείμενον in this way here (“holds”) in order to preserve the parallel with the following remark, which makes the point that the second type of hypothetical necessity is spoken of ἔστ’ ἂν ὑπάρχῃ τὸ κατηγορούμενον. If an English speaker were making this point, he would perhaps speak of a hypothetical necessity which applies while the subject exists and a hypothetical necessity which applies while the predicate holds of the subject.

²⁴ Sosigenes is also mentioned as the teacher of Alexander at Themistius, *in* DA61.23.

²⁵ Philoponus uses this curious expression, ὡς ὅτι (126.22), often in his writings, including six times in *in A.Pr.* Sometimes it means simply ὅτι (see 3.5), sometimes it means ‘so that’ (see 423.8). More commonly, however, as here, it seems to mean, ‘i.e., that . . .’ (see 329.17, 422.27, 456.25). (Often, as here, this latter usage occurs after a citation of some sort.)

the subject has changed when, at 126.23 and 28, the same word occurs again. Thus, it would seem that Alexander is here offering textual evidence on the side of Sosigenes for Aristotle's having employed some variety of hypothetical necessity. It is possible, of course, that the sentence beginning, "For, that this, he says, is what he meant is clear from the fact that . . .," is Alexander reporting the view of Sosigenes and not necessarily agreeing with it; but if this were the situation we would rather expect Philoponus to write something like, 'For, that this is what he (i.e., Aristotle) meant is clear, says Sosigenes, from the fact that . . .'.

I might acknowledge at this point that my reading is not the reading of Moraux, who regards Alexander's attitude (or reported attitude) in this passage to be inimical to Sosigenes.²⁶ Nor is this the reading of Maier.²⁷ It is, however, the reading of the 15–16th century commentator Laurentius Maiolus, who understands Philoponus to be saying that Alexander was of one mind with Sosigenes.²⁸

Secondly, we should simply note the obscurity of the textual evidence offered. Someone (Sosigenes or Sosigenes together with Alexander) says here that the fact that Aristotle adduces terms at *An.Pr.*30a28ff but not in *An.Pr.*30a15–24 argues for hypothetical necessity. I shall offer an exegesis of this puzzling remark below.

Thirdly, we might notice the mention here of different senses of necessity—reference being made to certain remarks by Aristotle in

²⁶ At Moraux (1984), p. 343–44, he concludes that ultimately Alexander rejected not only Herminus (another former teacher) but also Sosigenes. He acknowledges that Alexander appears to be better disposed toward Sosigenes than his other teacher Herminus; but this opinion is based only on a number of negative remarks aimed at Herminus (see, for instance, in *A.Pr.*74.6, 125.16). He says (with no qualification) that Alexander regarded Sosigenes' argument in favour of Aristotle's thesis as "nicht stichhaltig" (p. 342). He refers to Philoponus, in *A.Pr.*126.8–29, at p. 343, n. 38; see also p. 341, n. 31, where the suggestion is that Philoponus, in *A.Pr.*126.23–9, should be attributed only to Sosigenes.

²⁷ See Maier (1900), IIa, p. 130, n. 1. I discuss this below.

²⁸ See Maiolus (1497a), c.7.r. Maiolus, however, believes that Philoponus was wrong to attribute this view to Alexander, citing the latter's in *A.Pr.*140 as evidence. This is also, as we shall see, the text in Alexander that Moraux uses. Maiolus, incidentally, is extremely useful for the questions we treat here. He is very familiar with Alexander's in *A.Pr.* and also Philoponus and Averroes. For biographical information on Maiolus, see Dukas (1876), *passim*.

*On Interpretation.*²⁹ Just previously,³⁰ as we have seen, Philoponus has drawn a distinction between genuine parts (τοῖς . . . κυρίως αὐτοῦ μέρεσιν), which take on any modality assigned to their larger whole, and parts which sometimes fall under a larger whole, sometimes not. It might seem that we are talking about different distinctions here: a distinction between types of parts and one between types of necessity. And yet the proximity of these two remarks and the repeated use of κυρίως suggests a closer connection.

Fourthly, the distinction between types of hypothetical necessity is important. Philoponus speaks of the proposition ‘animal holds of Socrates’ as characterized by hypothetical necessity. It is clear what he means: Socrates could die tomorrow, and he would not then be an animal (i.e., a living creature). It is also apparent that this is quite a strong sense of necessity: it characterizes the relationship between an object and its essence. On the other hand, this is not the type of hypothetical necessity which is said to bring us past the Theophrastan problem: “We say, therefore, that the major premiss has been taken as involving proper necessity; the conclusion, however, as involving hypothetical necessity—‘while the predicate holds.’”

This creates a problem of internal plausibility. If, as Philoponus says, the major premiss of the anti-peiores syllogism is marked by proper (κυρίως—126.18) necessity, according to his previous remarks it must involve a relationship like that which exists between motion and the sun. But also the conclusion (if we take Philoponus’s examples quite literally) will have to be a proposition like, ‘Necessarily motion holds of every moving thing.’ This, however, severely limits what can appear as major and minor terms: they would have to be contrived so as to always involve a linguistic—or otherwise close logical—relationship (as with ‘motion’ and ‘moving thing’). This obviously puts a severe restriction on what is allowed into one of these syllogisms. Moreover, it is hard to see how this could be a solution to the Theophrastan problem, which involves terms which do not meet these requirements.

²⁹ Wallies gives the reference as *Int.*19a23ff. This is borne out by corresponding remarks in Alexander, as we shall see. We might also notice, in this connection, the use of the word κυρίως at 126.9. This is apparently Philoponus’s equivalent of the ἀπλῶς which Aristotle uses in the section to which Philoponus refers (see *Int.*19a26). See also Alexander’s in *A.Pr.*36.30 where he suggests that ἀπλῶς and κυρίως have roughly the same meaning. The context is a discussion of Theophrastus’s understanding of hypothetical necessity as opposed to necessity *simpliciter*.

³⁰ in *A.Pr.*124.18–20.

Even if it were possible to loosen up this restriction somewhat,³¹ it is difficult to construe any sort of necessity which might be limited to the time during which the predicate holds of the subject as sufficiently strong to appear in the conclusion of ‘NAaB & BaC → NAaC.’ Aristotle seems to have had something stronger in mind for such syllogisms—i.e., stronger than the necessity involved in the proposition, ‘Necessarily, while Socrates walks, he walks.’ Otherwise any assertoric conclusion would be necessary in the relevant sense.

To return briefly, however, to our list of details to be noted in Philoponus, in *A.Pr.*126, I might mention, fifthly, the phrase, “which also comes closer to the proper sense of necessity”: ὁ καὶ μᾶλλον τῷ κυρίως ἀναγκαίῳ συνεγγίζει [in *A.Pr.*126.14–15], said with reference to a proposition such as ‘animal holds of Socrates.’ This remark shall prove quite significant when we deal with Alexander’s understanding of types of necessity.

2.3 *Pseudo-Ammonius*, in *A.Pr.*38–41

Our next passage, {Ammonius}, in *A.Pr.*38.20–41.7, concerns much the same Aristotelian material—i.e., *An.Pr.*30a15ff. After some introductory comments concerning Aristotle’s decision to treat of mixed apodeictic-assertoric syllogisms before looking at the problematic, pseudo-Ammonius does a breakdown of those who (with respect to the anti-peiorum rule) agree with Aristotle and those who disagree with him. Theophrastus and Eudemus, he says, are joined by the Platonists in asserting that the conclusion follows the lesser mode, as with quantity and quality.³² “Of more recent authors, however,” he says, “Alexander and Iamblichus follow Aristotle, while Themistius, Syrianus and Proclus follow Theophrastus and Eudemus and the Platonists.”³³ Again we see opposed camps drawn up against each other.

³¹ Michael Frede has suggested to me that the major premiss might be something like ‘posture holds of every sitting’ and the minor ‘sitting holds of seated persons (while they sit).’ But ‘posture holds of every sitting’ is not characterized by necessity of the highest type, since all sitting things could go out of existence.

³² {Ammonius}, in *A.Pr.*38.38–40.

³³ {Ammonius}, in *A.Pr.*38.40–39.2. It is interesting to speculate whom pseudo-Ammonius might mean by “the Platonists.” Since the contrast is between ancient and more modern and Alexander is listed among the more modern, it does not seem that they could be any of the later Middle Platonists, such as Albinus. Dillon

Then we get a passage which is very much reminiscent of Philoponus, in *A.Pr.*124.16–24, i.e., the passage we saw above concerning genuine parts. Here in pseudo-Ammonius the argument (attributed to Theophrastus and Eudemus) is again that one cannot rely on the notion of a ‘part’ in order to derive a necessary conclusion, since there are parts and there are parts: genuine parts and parts which can be separated off from the middle term. We read: “But not of every part of B, they say,³⁴ does A hold of necessity but only of the necessary parts of it; and C is not one of these, because of the proposition BC’s being assertoric.”³⁵ The only difference between this passage and the Philoponus passage is that strictly speaking nothing in the Philoponus passage actively disallows the deriving of a necessary conclusion: he says only that if the parts are not genuine parts, you will not get a necessary conclusion. The argument here is taken further: “For because of [BC’s being assertoric] it is possible for nothing of C to be part of B, when it is separated from it. And since A is inseparable from B and B is separable from C, A is also separable from C; and because of this it does not hold of necessity of it” [39.7–10]. We shall see below that there is reason to believe that the Philoponus understanding is closer to what Theophrastus actually held.

I translate the next section ({Ammonius}, in *A.Pr.*39.10–40.2), pertaining to certain of the defenders of Aristotle, in full. It must be stated at the outset, however, that the text is in very bad shape and

[Dillon (1977), pp. 49–50, 103–4] perhaps sheds some light on this question. He points out, first of all, that the Middle Platonists tended to side with Theophrastus in strictly logical matters (p. 49). Then he says that the origin of this “process of synthesis” of Platonic with Aristotelian logical elements “may be attributed with some probability to Antiochus of Ascalon” (b. circa 130 B.C.) (p. 50). There is not much evidence, however, of early interest among Platonists in *An.Pr.*; most attention was paid to less formalistic portions of the *Organon*. Perhaps such mentions of early Platonists interested in the mixed modal syllogisms constitute the only evidence. This leads one to wonder whether Alexander discusses the work of these Platonists in *On mixed premisses*. Alexander speaks of οἱ περὶ Θεόφραστον at a number of places (see in *A.Pr.*34.15, 159.10, 174.18, 199.8). But in *A.Pr.*124.8–9 suggests that these might be early Peripatetics: οἱ δὲ γε ἐταῖροι αὐτοῦ οἱ περὶ Εὐδημόν τε καὶ Θεόφραστον. (The αὐτοῦ here refers to Aristotle.) And, in any case, ‘οἱ περὶ X’ is frequently just a paraphrase for ‘X.’

³⁴ The “they” here (which is of unclear antecedent in its original context) must refer to Theophrastus and Eudemus (and perhaps the Platonists). This is apparent from subsequent remarks [{Ammonius}, in *A.Pr.*39.7–10] which talk about separating the minor from the major term.

³⁵ {Ammonius}, in *A.Pr.*39.5–7.

the argument very allusive, so that sections of this translation represent nothing better than conjectures.

Alexander, however, joining ranks with Aristotle, demonstrates also through the impossible that the conclusion of this mood is necessary.³⁶ For if A does not hold of every C of necessity, it is possible that it does not hold of every. But, however, B holds assertorically of every C. Through, therefore, the fifth mood of the third figure, where even according to Aristotle the conclusion follows the lesser, <we get> ‘A possibly does not hold of every B.’ But also of necessity it holds of every—/15/ which is impossible, for this is a contradictory pair.

But (1) the proof is circular, for Aristotle will subsequently prove the just-mentioned proof of the third figure by means of the present mix;³⁷ (2) by means of the same arguments an assertoric, a problematic and an apodeictic are concluded.³⁸ For if A <holds> not of every C (as you might wish), since B of every C, A not of every B, and I do not mean *simpliciter*³⁹—which is impossible. For it was laid down that /20/ A holds of every B of necessity. So that either the three are not derived or not the apodeictic.⁴⁰ The reason for the absurdity following

³⁶ Emending τὸν τρόπον τοῦτον to τοῦ τρόπου τούτου. (The mood would be that just previously discussed: ‘NAaB & BaC → NAaC’). It might also be possible to translate τὸν τρόπον τοῦτον as an accusative absolute: “in this fashion,” there being a similar locution at 65.21 (also pseudo-Ammonius). But the γὰρ at 39.11 makes this unlikely. Alternatively, we could excise τὸν τρόπον τοῦτον, speculating that it originated as a marginal note. There is a “directional signal” of this sort at 37.2.

³⁷ Pseudo-Ammonius is referring to *An.Pr.*39b35–9.

³⁸ Emending ἀδύνατον (39.18) to ἀναγκαῖον.

³⁹ τὸ Α τῷ Β οὐ παντί, καὶ οὐ λέγω ἀπλῶς—39.19. This appears to be an abbreviated way of saying that depending on whether one has assumed the major premiss of the original syllogism as assertoric or problematic (“as you might wish” [ὥς ἂν ἐθέλης—39.18]) one will have either an assertoric or a problematic original conclusion. There is another more elaborate (and not incompatible) way of understanding the word ἀπλῶς. Pseudo-Ammonius’s presupposition throughout this section is that the different modes exclude one another. See, for instance, 37.27–9 where he says that Aristotle’s statement at *An.Pr.*29b29 that the assertoric, apodeictic and problematic are different indicates that in the modal sector (although see 38.6–7, where he talks only of the mixed modals) the meaning of ὑπάρχειν changes: it no longer allows into its connotation either the apodeictic or the problematic. (See also {Ammonius}, in *A.Pr.*viii.33–ix.4.) It is distinct from the problematic, for instance, in as much as the problematic is yet to come to be and the assertoric is the actuated possible [τὸ ἐκβάν ἐνδεχόμενον] (see 38.25). Perhaps, then, this is what pseudo-Ammonius means at 39.19 by “and I do not mean *simpliciter*”: that, although in general he presupposes the Aristotelian usage which isolates a “simple” sense of assertoric, here he is reversing that presupposition in order to save himself the trouble of constructing two different syllogisms.

⁴⁰ Pseudo-Ammonius has in mind, apparently, the following exclusive disjunction: ‘either not “the three” or not “the apodeictic.”’ But “the three” are derived (and the first disjunct is false); therefore, the second disjunct is true: the conclusion is not apodeictic.

whether the conclusion is hypothesized as apodeictic, assertoric, or problematic, is not the mode of the conclusion but <its> being derived truly 'of every' (for always from two universal affirmatives a universal affirmative follows in the first <figure>), it being hypothesized, however, 'not of every'.⁴¹

Sosigenes, however, the /25/ teacher of Alexander, said that an apodeictic 'with a limit' is derived: for while the middle holds of the last <term>, it is necessary that the major hold of the minor. As far as that goes, however, also when the major is assertoric, the conclusion is apodeictic, for again it is necessary that the major hold of the last <term> while the major holds of the middle, and every syllogism derives hypothetical necessity, because of the definition of the syllogism. Also, in the /30/ second figure Aristotle shows that a combination which does not conclude with an apodeictic concludes because of necessity with a limit.

Herminus,⁴² however, says that a necessary conclusion comes about not always but with certain matter. For if we take animal/man/walking, an apodeictic is derived; if however animal/man/moving, a problematic.⁴³ because of which Aristotle said 'it happens sometimes'.⁴⁴ But /35/ Aristotle has fixed the meaning of this by adding 'except not whichever it happens to be'⁴⁵ (but /40/ when the major is apodeictic). And he has also constructed the proof using letters, thereby rendering this <proof> universal.

2.3.1 *Philoponus and pseudo-Ammonius compared*

It will be easiest to treat of the pseudo-Ammonius passage by discussing its relationship to the Philoponus passage. It is necessary, however, first to establish that the above passage relies, at least mediately, on *On mixed premisses*. This is fairly easy to do—as Moraux has already to some extent shown.⁴⁶ There are three factors involved: 1) the content of the present passage; 2) the content of Alexander's in *A.Pr.*125.3–31, and 3) the full title of *On mixed premisses* ("Concerning the difference between Aristotle and his followers regarding mixes"—or, perhaps, "Concerning the disharmony of Aristotle and

⁴¹ In other words (?), the derivability of multiple conclusions is due to the *dictum de omni et nullo*. Whether the conclusion should be characterized by one mode or another would depend, therefore, not on the *reductio* method as it bears on mode, quantity and quality but as it bears on quantity and quality alone (see {Ammonius}, in *A.Pr.*38.2). Philoponus, in *A.Pr.*123.30–1, demonstrates a similar concern.

⁴² On this section see Moraux (1984), pp. 391–3.

⁴³ Omitting with Wallies *πεύδεται* ἡ—39.34.

⁴⁴ *An.Pr.*30a15.

⁴⁵ *An.Pr.*30a16–7.

⁴⁶ Moraux (1984), p. 393.

his followers . . .").⁴⁷ The similarity between the remarks concerning Herminus (39.31–40.2) of the present passage and Alexander's in *A.Pr.*125.3–31 (which concludes with a mention of *On mixed premisses*—125.30) is unmistakable,⁴⁸ thus establishing a probable connection between 39.31–40.2 and *On mixed premisses*. This finding is confirmed by the fact that the pseudo-Ammonius passage is so much concerned with personalities. We have seen this emphasis on personalities in connection with *On mixed premisses* before,⁴⁹ an emphasis consonant with the expanded title of *On mixed premisses*. Thus, there can be little doubt that pseudo-Ammonius is in some manner reliant on *On mixed premisses*.

With regard to the relationship between the Philoponus and pseudo-Ammonius passages, we might mention first of all that there is some initial evidence that the two passages go back to a common immediate source. (That Philoponus was at least mediately reliant *On mixed premisses* at his in *A.Pr.*122–6 goes without saying: he cites it at 126.21. One could also mention the emphasis on personalities there as well.) A few lines after the above translated passage (i.e., at {Ammonius}, in *A.Pr.*40.16–17), pseudo-Ammonius says he draws his information about "these things" from an exegete who followed the commentary of Iamblichus (ὁ ταῦτά μοι ἐξηγησάμενος τῷ Ἰαμβλίχου ὑπομνήματι κατακολουθῶν). Wallies identifies this exegete as Ammonius.⁵⁰ But Philoponus too is reliant on Ammonius, as we learn from the subtitle of his commentary.⁵¹ So, it is quite likely that both pseudo-Ammonius and Philoponus make use of information supplied to them by Ammonius.

There are also a number of structural and other similarities between the two accounts which confirm (to some extent) this finding.

⁴⁷ See note 8.

⁴⁸ Sharples appears to claim that Alexander's in *A.Pr.*125.3ff represents the view of Sosigenes [Sharples (1987), p. 1196]. On the other hand, at Sharples (1990), p. 87, n. 25, he (I believe) correctly associates this passage with Herminus. Either this represents a change of mind or the earlier remark constitutes a typographical error. Incidentally, what I say here about in *A.Pr.*125.3ff's correctly being associated with Herminus should not be interpreted as meaning that it is *only* to be associated with Herminus. As becomes apparent below, I believe that Alexander had a reason for not saying here, "This is the position of Herminus."

⁴⁹ See footnote 15.

⁵⁰ See Ammonius-{Ammonius}, in *A.Pr.* (CAG 4.6), p. vii. Ammonius died in 526 A.D., Iamblichus in 325.

⁵¹ Philoponus, in *A.Pr.*1.2–4. Cf. Sorabji (1987), pp. 3–4.

These similarities include one instance of almost identical phrasing: compare, for example, οἱ δὲ ἐταῖροι αὐτοῦ οἱ περὶ Θεόφραστον καὶ Εὐδημον καὶ ἔτι οἱ ἀπὸ Πλάτωνος in Philoponus (123.15–16) and οἱ δὲ ἐταῖροι αὐτοῦ Θεόφραστος καὶ Εὐδημον καὶ οἱ ἀπὸ Πλάτωνος in pseudo-Ammonius (38.38–9). We might notice also that both pseudo-Ammonius and Philoponus use the word συνηγορέω in this context: see Philoponus, 123.26; pseudo-Ammonius, 39.10. But this probably does not tell us a great deal, since Philoponus uses the word (and its derivative συνηγορία) often and we have too few of pseudo-Ammonius's writings to say anything about his linguistic habits in this regard.

2.3.2 *A difference regarding the reductio solution*

I would like now to examine a pair of passages which contain similarities suggesting a common source but also a crucial difference, which raises questions pertaining to the relative reliability of the Philoponus and pseudo-Ammonius accounts. The pair of passages I have in mind are {Ammonius}, in *A.Pr.*39.10–15 (which is translated in the larger translation just above) and Philoponus, in *A.Pr.*123.26–124.1. Both involve a reductio proof of ‘NAaB & BaC → NAaC,’ ascribed in the former instance to Alexander and in the latter simply to “the defenders” of the anti-peiorum rule.⁵² Both call special attention to the use of ‘MAoC & BaC → AoB’ in the reductio syllogism, although only pseudo-Ammonius makes the accusation of there being a circular proof involved; and both call attention too to the different elements possibly involved in the denial of the conclusion of the original syllogism: i.e., mode, quantity and quality.⁵³ This is evidence for the existence of a common source. But even more interesting is Philoponus's failure to attribute the argument to Alexander. Is this an inadvertence on his part, or does he have better information than pseudo-Ammonius? There is reason to believe the latter.

Pseudo-Ammonius is correct to point out that using ‘MAoC & BaC → AoB’ in the reductio syllogism involves a circular argument, since ‘MAoC & BaC → AoB’ itself is proved by means of ‘NAaB & BaC → NAaC’ (see *An.Pr.*39b35–39). But Alexander is well aware of this problem and, indeed, can be shown to have deliberately distanced himself from this solution. This comes across to some extent

⁵² {Ammonius}, in *A.Pr.*39.10; Philoponus, in *A.Pr.*123.26.

⁵³ See note 41.

at Alexander's in *A.Pr.*127.3–16, where he mentions a reductio proof of the anti-peioirem rule calling it only "the best" (as good as one can get) and adding a few lines later the remark: "Someone siding with Aristotle's opinions in these regards might use these and such like arguments. Which of them appears to be well or not well stated we have said with accuracy (as we have said) in other writings of ours."⁵⁴

These reservations about the reductio proof become unmistakable in the passage where he discusses 'MAoC & BaC \rightarrow MAoB': in *A.Pr.*247.9–248.9. There he proves the latter by converting MAoC to MAiC, then deriving (from 'MAiC & BaC') MBiA—which converts to MAoB.⁵⁵ He says that this is preferable, "for the reduction to the impossible has an objection."⁵⁶ A bit later he explains this remark,⁵⁷ mentioning that Theophrastus would not accept this proof of the syllogism 'MAoC & BaC \rightarrow MAoB,' since he does not accept 'NAaB & BaC \rightarrow NAaC.' Then he adds that "some" (τινες—248.6) try to use this combination ('MAoC & BaC \rightarrow MAoB') to prove 'NAaB & BaC \rightarrow NAaC' (i.e., the anti-peioirem rule) by reduction to the absurd. Quite obviously, Alexander does not include himself among this "some."⁵⁸

⁵⁴ in *A.Pr.*127.14–16. Łukasiewicz picked up the hints in this general section (see Łukasiewicz (1957), p. 185); Volait did not [Volait (1907), p. 57, 59]. Mignucci [Mignucci (1965b), pp. 25–7] discusses whether the proof at Philoponus, in *A.Pr.*123.26–124.1, could be Theophrastus's. He thinks not.

⁵⁵ in *A.Pr.*247.23–29. Alexander has in mind here here, of course, complementary conversion.

⁵⁶ in *A.Pr.*247.29–30.

⁵⁷ This section is difficult to follow because of what *seems* to be a misplaced piece of text at in *A.Pr.*247.31–9. These lines very awkwardly interrupt the flow of the argument (which is resumed at 247.39), moving from consideration of 'MAoC & BaC \rightarrow AoB' to consideration of 'AoC & MBaC \rightarrow MAoB.' Alexander however refers back to this latter argument at 248.12, so it would seem that Alexander is the one who was being less than careful.

⁵⁸ A similar point (i.e., that Alexander was aware of the problem and held himself back from a full commitment) can be made in connection with pseudo-Ammonius's second argument against Alexander, that "by means of the same arguments an assertoric, a problematic and an apodeictic are concluded" [{Ammonius}, in *A.Pr.*39.17–18]. Alexander proposes a rationale for the Aristotelian remark, but diffidently. He argues at his in *A.Pr.*154.26–31 that *An.Pr.*32a12–14, which says that "the conclusion will be neither necessary nor assertoric unless a necessary or assertoric proposition is assumed," ensures that, having disproved 'AaB & NBaC \rightarrow NAaC,' he can assume without further ado that 'AaB & NBaC \rightarrow AaC': "For he assumes this for no other reason except that it is necessary with a mix of this combination

It is hardly conceivable that Alexander did not similarly distance himself from this *reductio* argument in *On mixed premisses*, since he mentions the work shortly after this passage—i.e., virtually in the same breath as his saying that the *reductio* proof is the best that can be done for Aristotle. I am referring to the sentence, quoted just above, in which Alexander says that he has discussed these matters “with accuracy (as we have said) in other writings of ours” (*in A.Pr.*127.14–16). The back reference (“as we have said”) is to 125.30, where *On mixed premisses* is cited by name.

Thus, it would seem that either pseudo-Ammonius was misreading the source he shared with Philoponus or Philoponus had a better source than he. I prefer the former alternative, since it seems quite likely (as I have argued) that Philoponus and pseudo-Ammonius were reliant on a common source. And indeed it is fairly easy to understand how pseudo-Ammonius can have got the larger picture wrong. Alexander’s style is such that it is not infrequently difficult to say which of several possible understandings of a difficult passage he prefers.⁵⁹ Given his statement that “which of them appears to be well or not well stated we have said with accuracy . . . in other writings of ours,” it is unlikely that in *On mixed premisses* he left the Theophrastan problem utterly unresolved. But it is quite believable that it might have been difficult for a commentator to grasp just

that the conclusion be either assertoric or apodeictic” [*in A.Pr.*154.29–31]. Making the obvious application of this rule to ‘NAaB & BaC → ?AaC,’ one might say that one need not worry about also concluding a possible-2 conclusion, since there would be only two options available: necessary and assertoric. (It is not clear that the prospect of deriving also an assertoric conclusion from ‘NAaB & BaC’ would have worried Alexander: this may seem obvious, but below it will appear less so.) The problem is that *An.Pr.*32a12–14 does not say that, given such premisses, the conclusion must be either necessary or assertoric but that without such premisses the corresponding conclusions cannot be derived. Probably aware of the feeble nature of this exegesis, Alexander appends a more likely exegesis [*in A.Pr.*154.31–155.2], followed by an objection to this latter [155.3–7], followed by a chain of alternative exegeses (each introduced with the word *ἢ*: 155.8, 10, 12, 16, 20), some of them quite daft.

⁵⁹ See, for instance, *in A.Pr.*156.11–157.10 and 161.3–26 where this characteristic is most pronounced. See also *in Metaph.*141.21ff; 159.9ff; 162.6ff; 164.24ff; 165.4ff; 165.21ff; 169.11; 220.24ff; and 337.29. See Barnes et al (1991), p. 9; Sharples (1990), p. 97, and also Sharples (1982), pp. 97–99. I take the above list of Alexandrian passages from Sharples (1990), p. 97, n. 108. Moraux [Moraux (1967a), p. 169, n. 1] lists in addition *Quaest.*1.25 and the following passages from Simplicius’s commentaries on *Phys.* and *Cael.* (which contain fragments of Alexander’s lost commentaries on the same works): *in Phys.*44.21–7; 70.5–31; 234.11–29; 238.6–14; 244.25–245.2; 343.32–344.13; 1051.16–1052.8; 1218.20–35; 1234.23–28; *in Cael.*287.19–28; 309.6–21; 333.24–334.1; 404.4–27; 581.25–582.9.

what Alexander's final position was, especially if (for instance) this position was a combination of elements of other solutions.

We see this elusive quality in a number of passages which concern Theophrastus. Despite the many indications that he opposed Theophrastus in *On mixed premisses*, Alexander appears in a number of places to issue an endorsement of the Theophrastan position. See, for instance, in *A.Pr.*124.31–2, where, after presenting the Theophrastan refutation of 'NAaB & BaC \rightarrow NAaC' which uses adduced matter, he says καὶ τοῦτο εἰκότως γίνεσθαι δοκεῖ.⁶⁰ Or see in *A.Pr.*132.32, where he says that Theophrastus "proves" the peiorem rule and then, immediately after saying this, simply moves on to another topic, leaving the very strong impression that he agrees with the Theophrastan "proof."⁶¹

Volait characterizes Alexander's attitude to the Aristotelian doctrine in this way:

It is possible nonetheless that Alexander comes out in favour of this [i.e., Theophrastus's] criticism in so far as it succeeds in showing the insufficiency of the Aristotelian proofs—without thereby, like the radicals, wanting to infer the impossibility of there being a necessary conclusion in the combinations under consideration. Have we not seen that he put forward other arguments in favour of Aristotle's conception, one of which he appears also to favour?⁶²

The only problem with Volait's remark is that the last mentioned argument in Aristotle's favour is the "best" argument of in *A.Pr.*127, from which (as we saw) he distances himself. It is becoming understandable, I trust, how commentators such as Philoponus and pseudo-Ammonius might have attributed opinions to Alexander which he appears to reject in in *A.Pr.* and to disagree concerning which position is to be attributed to Alexander.

So then, I prefer to believe (on account of their acknowledged common debt to Ammonius) that Philoponus and pseudo-Ammonius were relying on a single source. But this source was ambivalent enough for pseudo-Ammonius (but not Philoponus) to attribute to Alexander

⁶⁰ It is true that Alexander can be understood here as saying something like, "And this approach has (only) some plausibility." But at least one commentator has interpreted it more strongly: see Maier (1900), IIa, p. 127, n. 1. On this see Volait (1907), p. 54–5.

⁶¹ On this passage see Volait (1907), pp. 54–5; also Maier (1900), IIa, 127, n. 1.

⁶² Volait (1907), p. 59.

the *reductio* solution and for Philoponus (but not pseudo-Ammonius) to attribute to him the Sosigenes “hypothetical necessity” solution. The ultimate cause of this ambivalence was Alexander himself.

2.4 *The vexed question of hypothetical necessity*

2.4.1 *Philoponus and pseudo-Ammonius*

So, we are back again with the difficult question, Alexander’s attitude toward hypothetical necessity. We have already taken note of certain difficulties in the Philoponus account: i.e., that his description of how hypothetical necessity provides Sosigenes with a solution to the Theophrastan problem appears internally implausible.⁶³ At this point we might call attention to an important difference between the Philoponus and the pseudo-Ammonius account. Philoponus says that the conclusion to ‘NAaB & BaC → NAaC’ involves “hypothetical necessity”⁶⁴—“while the predicate holds.” By this, as he makes clear, he means “while A holds of C.”⁶⁵ On the other hand, pseudo-Ammonius says that hypothetical necessity is derived insofar as, “while the middle holds of the last <term>, it is necessary that the major hold of the minor.”⁶⁶ There is no mention here of the conclusion’s being necessary while its predicate holds.

This is an altogether different approach, and one that (unlike the Philoponus presentation of the issue) has initial plausibility, insofar as here we see how hypothetical necessity might come into the conclusion. The hypothetical aspect, according to this understanding, is due to the context (i.e., the syllogism) in which it appears. More specifically, the conclusion is said to be hypothetical insofar as the middle (and therefore the major) term might not always hold of the minor term. As we shall see, this sort of discussion certainly appeared in the *On mixed premisses*.

⁶³ See p. 64.

⁶⁴ τὸ ἐξ ὑποθέσεως ἀναγκαῖον. This exact phrase occurs both in the Philoponus and the Alexander passage: Philoponus, in *A.Pr.*126.17; Alexander, in *A.Pr.*141.6. It does not occur in the relevant *Int.* passage. This suggests that the phrase plays a part in *On mixed premisses*.

⁶⁵ Philoponus, in *A.Pr.*126.17–20.

⁶⁶ {Ammonius}, in *A.Pr.*39.25–6.

2.4.2 *Alexander*, in *A.Pr.140.14–28*

So then, granted that the pseudo-Ammonius account of the Sosigenes position makes more initial sense than Philoponus's, can we say that this is the account that appeared in *On mixed premisses*? The answer must be, "yes and no." There is a passage in Alexander (in *A.Pr.140.14–141.6*), in the course of which he speaks of hypothetical necessity in much the same manner as pseudo-Ammonius does when he speaks of Sosigenes (in *A.Pr.39.24ff*). I will be examining this passage piece by piece in the next few sections. As a number of commentators (notably Moraux and Maier)⁶⁷ have suggested, Alexander in this passage does indeed appear to be working with the theory of hypothetical necessity as proposed by his teacher Sosigenes. But there are also important differences between this account and that found in pseudo-Ammonius.

Alexander's remarks on hypothetical necessity pertain to Aristotle's famous remarks at *An.Pr.30b31–40*, where he raises the issue of "relative necessity."⁶⁸ In this part of the *Prior Analytics* (*An.Pr.I,10*), Aristotle

⁶⁷ Moraux [Moraux (1984), pp. 342–3] argues that at in *A.Pr.140–1* Alexander (without actually naming him) is treating of Sosigenes' hypothetical necessity position. His argument that Alexander's remarks at in *A.Pr.140.14–141.16* concern Sosigenes is maintained against Bochenski's contention that this passage is about Herminus [Bochenski (1947), p. 80, n. 259]. Bochenski cites in this regard {Ammonius}, in *A.Pr.39.31*. Moraux remarks however that a comparison of the pseudo-Ammonius, Philoponus and Alexander passages shows that the latter is about Sosigenes [Moraux (1984), p. 343, n. 38]. This seems right—although, as I shall argue below, Moraux's suggestion that Alexander rejects the Sosigenes position needs to be qualified. So also does Maier's fairly strong claim (based on Philoponus in *A.Pr.126.17ff*) that Alexander "appears to have polemicized against his teacher Sosigenes" [Maier (1900), IIa, p. 130, n. 1]. Interestingly, though, Maier also says that Sosigenes "had associated himself with the Old Peripatetic reinterpretation (*Umdeutung*) of the Aristotelian remarks." He says too that "Alexander indicates his own position a number of times (e.g., in *A.Pr.126.18ff*)." It is very difficult, however, to find anything at in *A.Pr.126.18ff* which could be described as Alexander's own position. The closest thing would be in *A.Pr.127.3–16*, which we have already examined. For Maier's understanding of Alexander's critical attitude toward Theophrastus, see *ibid.*, p. 128, n. 1. It must be said too that Maier is well-aware of Alexander's ambivalence in these regards: "Although [Alexander] definitely rejected the reinterpretation [Umdeutung] which the Aristotelian remarks experienced at the hands of the Old Peripatetics, nonetheless with respect to the issue itself he aligned himself with the the latter" [*ibid.*, p. 130].

⁶⁸ τούτων ὄντων ἀναγκαῖον (*An.Pr.30b33*, also 38–9). On relative necessity see especially Patzig (1959), 188–90, and Maier (1900), IIb, pp. 245–7. We shall see below that Alexander refers to this sometimes as limited necessity—i.e., necessity μετὰ διορισμοῦ. To confuse things, pseudo-Ammonius refers to this type of necessity as hypothetical, as at {Ammonius}, in *A.Pr.39.29*—although see also line 31.

has been discussing second figure mixed modal syllogisms and he argues that the combination 'NAaB & AeC' gives rise not to an apodeictic but to an assertoric conclusion. Then he goes on: "Further one might show by an exposition of terms that the conclusion is not necessary *simpliciter*, though it is necessary given the premisses."⁶⁹ The terms he uses are animal/man/white. Animal holds necessarily of man. It can happen that animal holds of no white things. We can conclude that man does not hold of any white things—but not necessarily, for man could hold of a white thing: "but not while animal holds of no white thing, so that the conclusion is necessary 'these things being the case' but not necessary *simpliciter* [ἀπλῶς—30b39]" [*An.Pr.*30b37–40]. This is the line which Alexander's commentary picks up on:

In saying "but not while animal does not hold of any white thing, /15/ so that the conclusion will be necessary 'these things being the case' but not necessary *simpliciter*"—by means of this addition he makes it apparent that in the mixtures when he says that the conclusion is necessary he means necessity *simpliciter*, not necessity with a limit [τὸ ἀπλῶς ἀναγκαῖον λέγει καὶ οὐ τὸ μετὰ διορισμοῦ—140.18]. It is this <type of necessity> that certain of those who interpret the section about a mixture of premisses, intending to come to the aid of his doctrine,⁷⁰ /20/ mean when they suppose that Aristotle says that necessity *simpliciter* is not derived but necessity with a limit.

For they say that when animal holds of all men of necessity and man (as in the first figure) holds of everything that moves or walks, that a conclusion comes about which is necessary with a limit. For animal holds of everything that walks or moves, while the middle holds of it—i.e., /25/ man. For it is not the case that when the minor is necessary that this conclusion comes about: for not if motion holds of every animal, and animal of every man of necessity, does also motion hold of necessity of every man while animal holds of it (for this is false) but rather while motion holds of every animal [*in A.Pr.*140.14–28].⁷¹

At this point it will be convenient to introduce a notational device: abbreviations for adduced terms (or matter) to be inserted into syllogistic formulae: κίνησις will be κ, ζῷον will be ζ, ἄνθρωπος will be α.

⁶⁹ ἔτι κὰν ὅρους ἐκθέμενον εἴη δεῖξαι ὅτι τὸ συμπέρασμα οὐκ ἔστιν ἀναγκαῖον ἀπλῶς, ἀλλὰ τούτων ὄντων ἀναγκαῖον [*An.Pr.*30b31–33].

⁷⁰ βοηθεῖν οἰόμενοι τῇ δόξῃ αὐτοῦ. We might notice the parallel here with Philoponus, *in A.Pr.*126.7: οὐκ ἔστιν οὐδεμίαν βοήθειαν ἐπινοῆσαι τῷ Ἀριστοτελικῷ λόγῳ;

⁷¹ The terms adduced here are those which Alexander said (at *in A.Pr.*124.24–5) Theophrastus adduced in arguing for the peiorem rule. He in turn was using the terms that Aristotle provides at *An.Pr.*30a29–30 to prove 'AaB & NBaC → AaC.'

In this notation then, according to Alexander, Sosigenes held that in the syllogism ' $N\zeta\alpha\alpha \ \& \ \alpha\alpha\kappa \rightarrow N\zeta\alpha\kappa$,' the limit on $N\zeta\alpha\kappa$ is due to the relationship between the middle term, α , and the minor κ —i.e., to the fact that κ is contained in the minor premiss, subordinate to the middle term ("animal holds of everything that walks or moves, while the middle holds of it—i.e., man"). But the limit that appears in the conclusion is due not just to this middle-minor relationship but also to κ itself. This becomes evident when we move on to the second syllogism, ' $AaB \ \& \ NBaC \rightarrow AaC$ '—or, using matter, ' $\kappa\alpha\zeta \ \& \ N\zeta\alpha\alpha \rightarrow \kappa\alpha\alpha$.' For here the limit (insofar as there is one) has no connection with ζ , the middle, but is associated again with κ which is now in the position of major term.⁷² I shall be calling κ —or any similar term—the "limiting term," for it is this term which introduces into the syllogism the issue of a time limit— ζ and α being, in relation to κ , more permanent.

Now there are obvious similarities between this approach and that of pseudo-Ammonius: like pseudo-Ammonius (and unlike Philoponus), Alexander goes into the reasons why the necessity of the conclusion is limited. It would seem then that pseudo-Ammonius this time has (by whatever means) better appreciated a central argument made in *On mixed premisses*.⁷³ That realization must immediately be tempered, however, by the realization that, in his negative remarks concerning the Sosigenes position, he has probably distorted (or been given a distorted version of) this argument. For pseudo-Ammonius and Alexander use their common presuppositions to opposite purposes.

That is, pseudo-Ammonius acknowledges that Sosigenes provides an understanding of the necessity in ' $NAaB \ \& \ BaC \rightarrow NAaC$,' and then adds (as we have already seen):

As far as that goes,⁷⁴ however, also when the major is assertoric, the conclusion is apodeictic, for again it is necessary that the major hold of the last <term> while the major holds of the middle, and every

⁷² Maiolus discusses this argument at Maiolus (1497a), e.7.r-8.r. My remarks here and in what follows owe much to his discussion.

⁷³ Philoponus's tentative grasp of logical principles has been noted by a number of modern scholars: see Mignucci (1965b), pp. 29, 31; Bochenski (1947), pp. 23–4; Lee (1984), p. 43; see also Sorabji (1987), p. 37, who cites (n. 259) Simplicius, in *Cael.* 28.14–30; 30.16; 31.1–6; 116.12–13.

⁷⁴ Brunschwig (1990), *passim*, has shown that this expression ὥσον ἐνὶ + dative—see {Ammonius}, in *A.Pr.* 39.26–7) always has an oppositional sense such as we have given by translating it 'As far as that goes.'

syllogism derives hypothetical necessity, because of the definition of the syllogism [39.26–29].⁷⁵

But, according to Alexander, Sosigenes dealt with this problem by arguing that:

it is not the case that when the minor is necessary that this conclusion comes about: for not if motion holds of every animal, and animal of every man of necessity, does also motion hold of necessity of every man while animal holds of it⁷⁶ (for this is false) but rather while motion holds of every animal [140.25–28].

Thus, according to the latter account, Sosigenes has an understanding of the limit put on the necessity of the conclusion which does not also demand that ‘AaB & NBaC → ?AaC’ conclude necessary with a limit. It involves (somehow) the fact that the limiting term moves from the minor premiss (as in ‘Nζαα & αακ → Nζακ’) to the major premiss (as in ‘καζ & Nζαα → καα’).⁷⁷ On the other hand, according to pseudo-Ammonius it constitutes an objection to Sosigenes to point out that the limiting term κ appears alternately in the major and in the minor premiss.

2.4.3 *Alexander*, in *A.Pr.*140.25–28

Paul Moraux, the only modern scholar to have examined this section in Alexander at any length,⁷⁸ suggests that in *A.Pr.*140.25–28 is

⁷⁵ Moraux also reads this passage as a criticism of the previously set out position [Moraux (1984), p. 342, n. 36]. He calls attention to the parallel uses of ἀλλὰ at {Ammonius}, in *A.Pr.*39.5, 15, 34.

⁷⁶ The antecedent of ‘it’ (αὐτῷ—140.27) is α—man.

⁷⁷ At in *A.Pr.*28.10 (see also 27.29) Alexander indicates that material differences among propositions will be especially useful in dealing with mixed modal syllogisms.

⁷⁸ But elements of Moraux’s section on Sosigenes (or possibly its redaction) are a mess. Since Moraux represents such an authority, I must run through these difficulties, if only here in a footnote.

Moraux writes as follows:

“Alexander himself contends that this conclusion [i.e., the conclusion to ‘NAaB & BaC → NAaC’] is not of limited but of absolute necessity. He proposes several arguments [and here Moraux inserts a footnote: “140.25–141.16”], from which among other things it emerges: (a) that in a syllogism of the first figure, whose major is assertoric and whose minor is necessary, the conclusion is not of limited but of absolute necessity, (b) that Aristotle refers in the mixed syllogisms of the second figure with necessary majors to the limited necessity of the conclusion—which he would have done also in the first figure if its conclusion had been necessary with a limit” [Moraux (1984), p. 343].

an argument by Alexander against Sosigenes. The opposite, I think, is the case. That the passage is spoken from the perspective of Sosigenes is strongly suggested by the introductory words, οὐκέτι γὰρ (140.25). But the sense of the passage demands this as well. Most everyone acknowledges that Sosigenes was a defender of the anti-peio^{re}m rule. It is wholly in character therefore for him to hold (as is argued for in 140.25–8) that ‘ $\text{N}\zeta\alpha\alpha \ \& \ \alpha\alpha\kappa \rightarrow \text{N}\zeta\alpha\kappa$ ’ does not conclude with the same necessity that attaches to the conclusion of ‘ $\kappa\alpha\zeta \ \& \ \text{N}\zeta\alpha\alpha \rightarrow \kappa\alpha\alpha$.’ As in the Philoponus passage,⁷⁹ Alexander is joining his own voice to Sosigenes’s counter to the obvious objection that if the conclusion derived from ‘ $\text{N}\alpha\alpha\text{B} \ \& \ \text{B}\alpha\text{C}$ ’ is of limited necessity (in some sense), so will be the conclusion derived from ‘ $\text{A}\alpha\text{B} \ \& \ \text{N}\text{B}\alpha\text{C}$.’

It is difficult, however, to see *how* these remarks help Sosigenes. What relevant difference does it make that in ‘ $\text{N}\zeta\alpha\alpha \ \& \ \alpha\alpha\kappa \rightarrow \text{N}\zeta\alpha\kappa$ ’ the limiting term is in the minor premiss, while in $\kappa\alpha\zeta \ \& \ \text{N}\zeta\alpha\alpha \rightarrow \kappa\alpha\alpha$ ’ it is in the major? There is an answer to this question to be found in Alexander’s *in A.Pr.*, although it is an answer one must work to find.

At *An.Pr.*34b7–8, having argued that the combination ‘ $\text{A}\alpha\text{B} \ \& \ \text{M}^2\text{B}\alpha\text{C}$ ’ gives rise to the conclusion $\text{M}^1\text{A}\alpha\text{C}$, Aristotle remarks that “We must understand ‘that which holds of every’ with no limitation in respect of time, e.g., to the present or to a particular period, but without qualification.”⁸⁰ In an extended comment at *in A.Pr.*188.20–

First of all then, the footnote might suggest that (a) corresponds to *in A.Pr.*140.25–28; but there is no resemblance between (a) and that passage. Secondly, what is stated in (a) is neither true (in any system of modal logic, as far as I know) nor does it constitute an argument against the claim that ‘ $\text{N}\alpha\alpha\text{B} \ \& \ \text{B}\alpha\text{C} \rightarrow \text{N}\alpha\alpha\text{C}$ ’ concludes with a proposition that is necessary with a limit. So, (a) would seem rather to form part of Moraux’s explanation of *in A.Pr.*140.29–34, and he must mean that Alexander holds (first) that in a syllogism of the first figure, whose major is *necessary* and whose minor is *assertoric*, “the conclusion is not of limited but of absolute necessity” (which is fair enough).

But there’s also a problem with the second part of this explanation—i.e., (b). Alexander does not say in the pertinent passage that Aristotle finds hypothetical necessity in any syllogism with a necessary major but rather in those syllogisms containing a necessary affirmative, whether it be the major or not (all other such mixes concluding necessary *simpliciter*) [*in A.Pr.*140.31; see also *in A.Pr.*137.24–138.2.]; and he does not say that Sosigenes held that the conclusion’s possibly being necessary with a limit is an issue with *any* mixed assertoric-apodeictic syllogism of the first figure: it is only an issue when the major is necessary.

⁷⁹ Philoponus, *in A.Pr.*126.20ff.

⁸⁰ That this remark of Aristotle’s plays a part in Alexander’s *On mixed premisses* is suggested by Averroes’ *Questions* 4 [FHS&G 98B]. (I argue below that question 4 is related to *On mixed premisses*.)

191.18, Alexander explains this remark in terms of universals over time.⁸¹ Take, for instance, Alexander argues, the combination ‘ $\zeta\alpha\kappa$ & $M^2\kappa\lambda$ ’ (where ζ = animal, κ = in motion, λ = stone), both elements of which we might easily assume to be true.⁸² But it is not the case that $M^1\zeta\alpha\lambda$. How is it that we get this counter-example? he asks. The problem is that the first premiss, containing the limiting term κ , is not (as it should be) a universal.⁸³ In a full analysis of how a problematic proposition such as $M^2\kappa\lambda$ relates logically to other propositions with which it might be combined, we must take into account the—that is, a—impossible world in which it is actually true.⁸⁴ But in that world, the major premiss $\zeta\alpha\kappa$ could not be true, since animal holds of no stone. This means that, considering both premisses in their full modality (or temporality), the minor extends beyond the compass of the major—and, thus, the major is not really a universal.⁸⁵ Since, therefore, a universal major is required for a syllogism,⁸⁶ ‘ $\zeta\alpha\kappa$ & $M^2\kappa\lambda \rightarrow M^1\zeta\alpha\lambda$ ’ is no syllogism. One can avoid such results, however, by stipulating that the assertoric major premisses in such syllogisms be not limited in this way with respect to time. If this is maintained, the major premiss will always “contain” the minor and we shall have a syllogism.

Now Alexander is not unaware of the problem which sits on the surface of this claim: it seems to demand that the assertoric major be apodeictic.⁸⁷ So he explains that ‘not limited with respect to time’ means not that the assertoric must be true at all times but that it must remain true even when the problematic premiss assumed along with it is considered as if it were actually true.⁸⁸ This would not prevent an apodeictic proposition from serving as the assertoric, but it would allow assertorics also to do so, as long as it is understood that nothing will satisfy the specification of the minor term unless it also falls under the modal compass of the major. Thus, a combina-

⁸¹ On the connection for Alexander between modality and time, see Barnes et al (1991), pp. 79–80.

⁸² Alexander uses this example at *in A.Pr.*189.20ff.

⁸³ In fact, Alexander says it’s a particular! [*in A.Pr.*189.15–16, 25].

⁸⁴ I explain this approach in more detail in Flannery (1993).

⁸⁵ *in A.Pr.*188.25–28. I shall refer to this compass of the major term as the ‘modal compass.’

⁸⁶ See *in A.Pr.*49.1–3. Alexander can say, despite the existence of such moods as Disamis and Bocardo, that every syllogism must have a universal major, since he holds that all moods are reducible to moods of the first figure.

⁸⁷ *in A.Pr.*189.33.

⁸⁸ *in A.Pr.*189.27–30.

tion of the form 'AaB & M²BaC' would give rise to a conclusion of the form M¹AaC, if the corresponding terms are (for instance) animal/motion/man.⁸⁹ Alternatively, we could use the terms walking/educated/man.⁹⁰

Now that we see how Alexander understood the major term in such contexts, we can see how he would have explained more fully the difference between 'Nζαα & αακ → Nζακ' and 'καζ & Nζαα → καα.' We must maintain, he would say, that the conclusion Nζακ involves hypothetical necessity for, if we do not do so (i.e., if it is not the case that Nζακ is true "while the middle holds of it—i.e., man"), the danger exists that κ might stand outside the modal compass of the major term ζ. In this event, there would not be a syllogism. Insisting that the conclusion be of hypothetical necessity ensures that κ remain within the modal compass of the major insofar as it means that, if a κ is discovered which falls outside this compass, by stipulation it is not among the things the syllogism is about. On the other hand, with the syllogism 'καζ & Nζαα → καα,' the major's possibly not constituting a universal is not a problem, for κ is the major term. It hasn't any limiting terms under it which threaten to escape its modal compass. Motion (κ) does not hold of man (α) "while animal holds of it" (i.e., man), "but rather while motion holds of every animal." This is, to be sure, a limit, but one that is involved in all syllogisms. There is no necessity here, except the standard syllogistic (or relative) necessity.

We have now an understanding of the difference it makes that in 'Nζαα & αακ → Nζακ' the limiting term is in the minor premiss, whereas in 'καζ & Nζαα → καα' it is in the major. We have, that is, a plausible positive account of the Sosigenes approach to the Theophrastan problem.

2.4.4 *Alexander*, in *A.Pr.*140.29–34

Moraux identifies in *A.Pr.*140.25–141.16 as a series of anti-Sosigenes arguments. We have just seen that 140.25–28 is actually made on the side of Sosigenes. Moraux, though, is correct, I believe, with regard to the next section, 140.29–34: it is certainly critical of Sosigenes—although not perhaps in the way Moraux has in mind.

Alexander's argument at 140.29–34 (a textual one) is that Aristotle

⁸⁹ in *A.Pr.*190.24–6.

⁹⁰ in *A.Pr.*190.34–191.1.

cannot have meant that the conclusion of 'NAaB & BaC \rightarrow NAaC' (or 'NAaB & BiC \rightarrow NAiC') is characterized by relative necessity:

That, however, Aristotle does not want the conclusion to be necessary in this way he has made clear by, /30/ having shown that a conclusion necessary in this way comes about in the second figure (if the affirmative proposition, whether it be the major or the minor, is necessary), saying that the conclusion in this mixture is not necessary *simpliciter*. Had he meant this necessity was similar to the former, would he not have added in the former instance that it was necessary not *simpliciter* but with a limit, as here? [140.29–34].⁹¹

In other words, had Aristotle meant that the conclusion to 'NAaB & BaC \rightarrow NAaC' was necessary with a limit ("in this way"), when he spoke of the moods which do seem to conclude necessary *simpliciter*, he would have *mentioned* that they concluded necessary with a limit. It is unclear, when he speaks of "the former" whether Alexander means only first figure syllogisms such as 'NAaB & BaC \rightarrow NAaC,' or whether he means to include also second figure moods such as 'NAeB & AaC \rightarrow NAeB' and 'AaB & NAeC \rightarrow NAeB,' of which he has just spoken (140.17–8 might suggest this). This makes no difference to his argument, however—which is that even if we grant, with Sosigenes, that there's a way of construing the necessity (for instance) of the conclusion to 'NAaB & BaC \rightarrow NAaC' as necessary with a limit, Aristotle does not seem to have wanted to identify *this* type of necessity with that which attaches to any syllogism in that it is a syllogism. This is different from what Moraux has in mind. Whereas he holds that Alexander objected to limited necessity in *itself*, Alexander's objection is only to identifying it with the type of necessity spoken of at *An.Pr.*30b33.

Before moving on to the next bit in Alexander, I must straighten out a terminological matter which has been in the background of this discussion for some time. I mean the distinction between 'limited necessity' [ἀνάγκη μετὰ διορισμοῦ] and 'hypothetical necessity' [ἀνάγκη ἐξ ὑποθέσεως]. In a sense, Moraux is right: Alexander does object to limited necessity, insofar as this expression might make reference to the type of necessity (also called relative necessity) which is discussed at *An.Pr.*30b31–40. But Moraux thinks that Alexander objects to the notion itself—i.e., to the notion that the conclusion to

⁹¹ Maier misunderstood this remark of Alexander's: see Maier (1900), IIa, p. 118, n. 1 and p. 128. See also Volait (1907), p. 65.

'NAaB & BaC \rightarrow NAaC' might involve a temporal limit ($\xi\sigma\tau$ $\delta\nu$. . .) of some sort. This in not so. In order to distance himself from the first type of necessity (i.e., relative necessity) as the proper solution to the Theophrastan problem, he tends to use the expression 'hypothetical necessity' (which we find also at Philoponus, in *A.Pr.*126.9)⁹²—but this type of necessity also involves a temporal limit. 'Limited necessity' becomes the term by which he refers to the lowest grade of hypothetical necessity. I think that probably Sosigenes, having worked out a coherent understanding of the hypothetical necessity involved in 'NAaB & BaC \rightarrow NAaC,' associated it in a comment with *An.Pr.*30b33. Alexander rejected this association and instituted in his own writings a terminological distinction which assigned to the lowest grade(s?) of necessity (like that at *An.Pr.*30b33) the name 'limited necessity.' On the other hand, the higher grade of hypothetical necessity could, according to Alexander, also be called 'necessity *simpliciter*' [$\alpha\nu\acute{\alpha}\gamma\kappa\eta$ $\acute{\alpha}\pi\lambda\acute{\omega}\varsigma$]. I shall be backing up these claims below.

2.4.5 *Alexander*, in *A.Pr.*141.1–6

What then about 141.1–6, the next bit in the series? The passage runs as follows:

At the same time, however, by means of the addition, he has made clear that he too knows the division of necessity which his disciples made which, anticipating, he had already indicated in *On Interpretation*, in the place where, with regard to the so-called contradiction concerning future time, about statements regarding individuals he says: "What is, necessarily is, when it is; and what is not, necessarily is not, when it is not." For this is hypothetical necessity.

What is the argumentative force of this passage? At first glance one might think that it was coordinate with what immediately precedes it: i.e., Alexander's textual argument (in connection with *An.Pr.*30b32–3) that, had Aristotle meant to imply that the conclusion of, for example, 'NAaB & BaC \rightarrow NAaC' was necessary with a limit, he would have mentioned this. According to this understanding the combined passages (140.29–141.6) would be arguing: "He did not say this, and yet he *knew* the distinction: he talks about it in *De Interpretatione*." But it seems unlikely that Sosigenes needs reminding

⁹² See also note 68.

that Aristotle knew the distinction: that is his whole point—i.e., that this *was* Aristotle's understanding.

Actually, the way Alexander frames the present remark makes it clear that it is coordinate not with 140.29–34 but with 140.16–17. There he had said that “the addition” (ἡ προσθήκη)—i.e., *An.Pr.*30b38–40 where Aristotle says that the conclusion to the pertinent second figure syllogisms “will be necessary ‘these things being the case’ but not necessary *simpliciter*”—makes it apparent that he does not have in mind for the conclusions of the other mixed assertoric-apodeictic syllogisms hypothetical necessity but rather necessity *simpliciter*. Now he is saying: “At the same time, however, by means of this addition he also makes it clear that he knows the distinction of which Sosigenes speaks—a distinction of which Aristotle speaks also *previously* in *De Interpretatione*.” The expression ἅμα δὲ can conceivably introduce an idea coordinate with what immediately precedes (see, for instance, in *A.Pr.*252.5). But Alexander makes it clear that this is his second point concerning the addition (i.e., that the first point began back at 140.14) by a repetition of phraseology. At 140.16–17, as introduction to his first point, he writes, διὰ δὲ ταύτης τῆς προσθήκης ἐδήλωσεν; at 141.1–2, in making his second point, he writes, ἅμα δὲ καὶ . . . δεδήλωκε διὰ τῆς προσθήκης.⁹³

Again, it makes no sense to say that Alexander is saying that “the addition” simply shows that Aristotle knew the distinction. Of *course* the remark shows that he knew the distinction: most any remark shows that the person making it knows what he says. The point of Alexander's remark must, rather, be to bring to the fore the fact that even before *An.Pr.*30b33ff—i.e., at *Int.*19a23–27—Aristotle had introduced hypothetical necessity. The citation then is an anticipation of an argument that Alexander sees could be brought against a Sosigenes-type approach: that Aristotle could not possibly have meant hypothetical necessity at *An.Pr.*30a15–23, since he only introduces it at *An.Pr.*30b33. There is no question that Alexander regarded *Int.* to be earlier than *An.Pr.*: see in *A.Pr.*160.32–161.1. And Alexander invariably uses the word φθάνω (as here at 141.2 where he speaks of Aristotle's “anticipating”) to indicate such prior mention in an extended argument.

⁹³ We find a very similar use of ἅμα δὲ at 176.10 where Alexander makes a second point after a long first point. For other uses in *in A.Pr.* of ἅμα δὲ, see 8.19; 12.13 and 113.10 (where the ἅμα δὲ is coordinate with ἅμα μὲν); 206.11; 368.14; 385.14.

This understanding has the added advantage of being consistent with Philoponus's use of *Int.*19a23–27 at *in A.Pr.*126.8ff. There, just a few lines before citing *On mixed premisses*, he uses the *Int.* passage as evidence for the Sosigenes position. It seems easier to believe that he simply took this point directly from Alexander (who we know used it in some fashion when treating the Sosigenes position) rather than that he altered it in order to put it to opposite purposes.

2.4.6 *Alexander, in A.Pr.*141.6–16

That leaves to be considered, of the larger passage that Moraux characterizes as critical of Sosigenes (i.e., Alexander's *in A.Pr.*140.25–141.16), 141.6–16. This, however, is certainly not an anti-Sosigenes argument. Wallies' paragraphing is deceiving. In typical fashion, Alexander has returned here quite suddenly to the Aristotelian argument set out at *in A.Pr.*139.29–140.13, saying that Aristotle could have picked better terms. This is perhaps further evidence that the ἄμα δὲ of 141.1 introduces a sentence which is coordinate not with the anti-Sosigenes point that immediately precedes it but with the earlier passage we indicated. By the time he gets to 141.6, Alexander has left the Sosigenes question well behind.

So then, instead of a series of anti-Sosigenes arguments, we have a series, consisting of four arguments, two of which speak in favour of Sosigenes, one of which speaks against him and another which does not apply at all. The argument at 140.29–34 is certainly critical of the Sosigenes claim. But we must, as we have already seen, be extremely cautious—particularly with respect to the present cluster of considerations—before pronouncing that Alexander has decisively rejected one position or another. Even after issuing a criticism of a position (and in this case, the criticism does not touch any essential logical principles), he is as likely as not to speak in favour of it. And, indeed, in the present instance, he does so within a few lines of the negative comments.

We can conclude then, I think, that Alexander with regard to mixed modal assertoric-apodeictic syllogisms does not absolutely oppose a Sosigenes-type approach. Indeed, he seems to favour such—although he seems to favour as well the Theophrastan position and even (to some extent) the Herminus position.⁹⁴

⁹⁴ See 125.28–9 where, after criticizing what appears to be the Herminus position (see Moraux (1984), pp. 391–3), Alexander says, διὸ τοῦτο μὲν παραιτητέον ὥς

2.4.7 *Alexander*, in *A.Pr.*129–30

Is there no passage in Alexander where he speaks more directly about how he understands hypothetical necessity to come into syllogisms containing apodeictic and assertoric premisses? Fortunately, there is, although the details were apparently saved for *On mixed premisses*.⁹⁵

The passage I mean—in *A.Pr.*129.23–130.24—appears shortly after the passages we looked at to some extent above in which Alexander rejects various solutions to the Theophrastan problem (i.e., 125.3ff). The argument is very allusive. Alexander is discussing the remarks at *An.Pr.*30a28–33, which argue that it is possible to prove by the adduction of terms that in the first figure, when the necessity is on the minor premiss, the conclusion is not necessary.⁹⁶

[1] He proves and demonstrates this also using terms, for if A is motion, B animal and C man, motion will hold of every animal /25/ assertorically, animal of every man of necessity and motion of every man—not however of necessity. [2] However, it is worth attending to how here, having proved by means of terms with regard to this combination that a certain⁹⁷ necessary conclusion is not derived, he has not also understood that the same thing can be proved with regard to the combinations having majors which are universal and necessary; /30/ for with these, laying down the same terms shows similarly that the conclusion is not necessary. [3] For let's take animal to hold of every man and man of every moving thing: 'animal holds of every moving thing' will be derived.⁹⁸

[4] But this appears to result only from 'of all of necessity,' taken as meaning,⁹⁹ when nothing of the subject is to be taken of which the predicate /130/ will not be said¹⁰⁰ of necessity. [5] If therefore he takes

κενὸν παντάπασιν. Immediately after that, however, he says, *παραιτητέον δὲ καὶ τὴν ἐπὶ πλέον ἐξέτασιν τοῦ λεγομένου*, and then refers to *On mixed premisses*. I shall discuss, though, below a possible connection between in *A.Pr.*125.3ff and (besides Herminius) Theophrastus.

⁹⁵ Or, perhaps more precisely, had already been presented there, if we assume that Alexander's references to *On mixed premisses* were not inserted after in *A.Pr.* was completed. The frequency of references to *On mixed premisses* would, in any case, suggest that the two works were written at roughly the same time.

⁹⁶ In the following translation, besides giving numbers (between slashes) indicating lines in Wallies' text, I tag each sentence with a number in square brackets.

⁹⁷ According to the understanding shortly to be presented, it is clear why Alexander wrote *τι συμπέρασμα* at 129.28. We should resist then (with Wallies) the temptation to omit (with a and K) the *τι*.

⁹⁸ These are the terms adduced by Theophrastus: see in *A.Pr.*124.24–5.

⁹⁹ ἀλλ' ἔοικεν ἐπακολουθεῖν μόνῳ τῷ κατὰ παντὸς ἐξ ἀνάγκης ὡς σημαίνοντι “ὅταν . . .” [129.33–4].

¹⁰⁰ Up until this point, we have a *near* quotation of the *dictum de omni et nullo*, as

the things under B to be so constituted as to be parts of B, he has assumed A to be predicated of them of necessity. [6] This would be true if everything under B was a part of B—and part in such a way as to be in its essence. [7] If however some of the things under B can also be /5/ separated from it, of things which are in this way under B, A will not hold of necessity.

[8] The cause of this going astray¹⁰¹ <rests> with the universal holding. [9] For since, in the former, A must certainly¹⁰² hold of the things under B (if it holds of every B), it would seem also to follow that A holds necessarily of them, if necessarily it holds of every B—this, however, since the things under B are parts of B. /10/ [10] But it is the looser sense of ‘are parts of B’¹⁰³ that gives the impression that they are in its essence—if they are not so constituted, A would not hold of them of necessity. [11] For that which holds of necessity holds not just now but also later.

[12] Therefore he does not posit an assertoric proposition. [13] For where that which is predicated of all B of necessity will /15/ also hold of necessity of the things under B, there there is necessity. [14] With regard, however, to that which is predicated of all of B assertorically, it is true that “nothing is predicated of the things under B of which that which is said of all of B will not be said” (for, whether B is predicated necessarily or assertorically of these things, that which is predicated of all of it can truly be said to belong to them). /20/ [15] It is not true, however, that of those things of which B is predicated assertorically, that which is predicated of necessity of all of B will be predicated of these of necessity. [16] For it is true to say of that which holds of necessity that it holds; but to say of that which holds *simpliciter* that it holds of necessity is not true.¹⁰⁴

[17] That however a universal assertoric is the hypothesis he has also just now made clear by the terms which he adduced.

Alexander’s overall argument is this: a difficulty with Aristotle’s claim that one can show by means of adduced terms that ‘AaB & NBaC’

found at *An.Pr.*24b29–30. I leave out Wallies inverted commas, which are inappropriate here.

¹⁰¹ παραγωγῆς—130.6.

¹⁰² πάντως—130.7. Perhaps ‘generally’ would be more suitable here? See my argument following.

¹⁰³ τὸ τινὰ τοῦ Β εἶναι κοινότερον λεγόμενον—130.10.

¹⁰⁴ τὸ μὲν γὰρ ἐξ ἀνάγκης ὑπάρχειν εἰπεῖν ἀληθές, τὸ δ’ ὑπάρχον ἀπλῶς ἐξ ἀνάγκης εἰπεῖν ὑπάρχειν οὐκ ἀληθές—130.22–23. This might be represented in symbols (in which → represents implication and *p* any proposition): ‘*Np* → *p*’ but not ‘(*p* → *Np*).’ There is an alternative way of reading 130.22–23: one can understand the ἀπλῶς as qualifying ἐξ ἀνάγκης εἰπεῖν ὑπάρχειν. According to this reading, Alexander would be saying here that an assertoric minor (such as that in ‘NAaB & BaC → NAaC’) is not *necessarily* necessary. (This will perhaps seem a more plausible reading after my remarks in explication of this passage.)

does not give an apodeictic conclusion is that, using the same terms, one can also show that the combination ‘NAaB & BaC’ does not give an apodeictic. This is only so, however, he says, if we assume that the *dictum de omni et nullo*, formulated by Aristotle with reference to assertoric universal propositions, is to be understood in a strong sense with regard to apodeictic propositions—that is, if we regard it as requiring not only that the predicate of a proposition hold of all the things falling under its subject but that it hold of them necessarily (see especially [4]–[5] and [8]–[10]). (In what follows, I shall sometimes refer to this strong sense as “the strong dictum,” the standard sense as “the standard dictum.”)

Later in the commentary, Alexander makes a connection between this understanding of necessity’s applying or not and things Aristotle says about the application of the *dictum de omni et nullo* to problematic premisses. These later remarks of Alexander will help us to understand his point here. At the beginning of the problematic sector of the syllogistic, Aristotle indicates that he will in certain contexts be employing a specified sense of ‘possible.’ The passage (a difficult one)¹⁰⁵ is here translated quite literally:

Because the phrase ‘one thing may hold of another’ can be understood in two senses—since a predicate can hold or possibly hold of a subject (for the phrase ‘that of which B, A may’ can refer either to (i) that about which B is said or (ii) that about which B might be said)—and ‘that of which B, A may’ differs not at all from ‘A may hold of every B,’ it is apparent that to say ‘A may hold of all B’ is [also] equivocal [*An.Pr.*32b25–32].

The essential point of this passage is that, although it is possible for us, when we say ‘A may apply to B,’ to mean ‘A may apply to what is in fact B,’ there is another sense of the expression in which possibility is asserted of anything which either is or *may* be B.¹⁰⁶

Now Alexander gives this same explication at *in A.Pr.*166.5–19,

¹⁰⁵ Becker considered the passage to have been drastically reworked [Becker (1933), pp. 36–7]. Ross agrees that the passage is difficult but rejects his excisions [Ross (1949), p. 329]. For a brief history of the treatment and use of the passage see McCall (1963), pp. 18–22. See also Patzig (1968), p. 63, and Flannery (1987), p. 466.

¹⁰⁶ Strangely, Aristotle never says clearly which understanding of universal problematic propositions he prefers (see Mignucci (1969), pp. 304–6, 310, also Alexander, *in A.Pr.*169.26–33). I argue at Flannery (1987), pp. 467–8, that he in fact opts for the latter understanding.

and then adds a remark which sheds a good deal of light on our present passage. For he says:

But if 'that of which B, A may' /20/ has two senses, then so will 'that of which B, A of necessity,' for <'that of which' can mean> either 'that of which assertorically' or 'that of which of necessity.' But if this is the case, the proposition 'A of every B of necessity' will not be equivalent to 'of all of which B holds, of all of this A holds of necessity,' as some of those say who demonstrate that it is true that from a necessary major and an assertoric minor a /25/ necessary conclusion comes about [*in A.Pr.*166.19–25].

In other words, just as with the *dictum de omni et nullo* insofar as it impinges upon problematic premisses, so with necessary premisses, one cannot say that it demands that the mode of a major term come down onto the minor term of a syllogism. Thus, this argument against 'NAaB & BaC → NAaC' does not hold up: Aristotle uses, instead of the strong dictum, the standard one.

But how, one might well ask, does this bear on the Theophrastan problem? Maintaining the strong dictum, it would appear that Aristotle's position (the anti-peiores rule) must be sustained, for the necessity of the major will follow through to the minor. Let's say, on the other hand, that the standard dictum applies: if in the mood 'NAaB & BaC → ?AaC' only the predicate A and not the necessity comes down in the conclusion upon the minor term, this would support the Theophrastan position.

A key to understanding Alexander's strategy comes just after he has reiterated his rejection of the strong dictum, i.e., at [11], where he says: "For that which holds of necessity holds not just now but also later." If the strong dictum holds, then Aristotle is defeated for he would have to account for everything that *might* turn up within the modal compass of the major term, for it takes in all time. The terms ζ (animal), α (man) and κ (motion) would be decisive against him: κ is sure sometime to stand outside the modal compass of ζ. If on the other hand the *dictum de omni et nullo* does not demand this, the anti-peiores rule can still hold. When insisting on 'NAaB & BaC → NAaC,' Aristotle would have in mind hypothetical necessity—necessity in which it is stipulated that, if something stands outside the modal compass of the major, it is not pertinent to what the syllogism says.¹⁰⁷

¹⁰⁷ There is an objection to this understanding of the passage which must be met.

At this point comes what might otherwise be regarded as a surprising turn in Alexander's argument. He says at [12] that, therefore, Aristotle does not posit an assertoric proposition—by which he means the minor premiss of 'NAaB & BaC → NAaC.'¹⁰⁸ However strange this might sound, it certainly follows from what he has said just previously. If one maintains the standard dictum, if BaC is really

How do we know that, at [8] (which reads, ἦν δὲ ἐπὶ τῆς καθόλου ὑπαρχούσης τῆς παραγωγῆς ταύτης αἰτία—130.6), Alexander does not mean Aristotle? This cannot, however, be the intention of [8]. The "going astray" is described in sentences [2] and [3]: someone objects that one can also prove, using terms, that 'NAaB & BaC' concludes assertorically. Sentences [4] through [7], on the other hand, introduce a *response* to this objection, as is indicated by the word 'but' (ὅλλ'—129.33), at the beginning of [4]. The non-Aristotelian result occurs only if one assumes the strong dictum. It's true: had Alexander wanted to maintain that Aristotle was the one led astray, the most readily available argument would have been that he failed to distinguish these two ways of understanding the sense of a universal (although this would be to use Aristotle's own insight against him: see *An.Pr.*49b14–17 and also 32b26–32). But the structure of the general argument does not support this reading.

There is further indication that Alexander understood Aristotle to have the right approach to 'NAaB & BaC → NAaC' and 'AaB & NBaC → AaC.' At *in A.Pr.*144.23–145.20, Alexander discusses the second figure mood Baroco containing an assertoric major and an apodeictic minor, which Aristotle says concludes assertorically ('AaB & NAoC → BoC'). Alexander says that someone might raise the objection that it is possible to prove by ecthesis that the conclusion is apodeictic, and he sets out such a proof in which NAoC becomes a negative universal and, having been converted, becomes the major premiss in the syllogism 'NCeA & AaB → NCeB' [*in A.Pr.*144.25–145.4]. Alexander admits that this would be decisive against Aristotle [145.12–13], except for the fact that Aristotle proves his point—i.e., that the conclusion is not apodeictic—by adducing terms [see *An.Pr.*31a14–15]. "But he has shown by means of terms," says Alexander, "that the conclusion is not necessary" [145.4–5]. And then he gives the syllogism 'ακ & Νζαλ → κολ' (ζ = animal; κ = motion; λ = white). "Which <fact> [says Alexander] it is necessary to regard as the same sign that, according to Aristotle, in the mixture of an apodeictic and an assertoric, an apodeictic conclusion does not come about—where he pursues the enquiry with matter and does not invoke the 'of none of necessity,' with regard to which the going astray comes about" [145.7–11]. Alexander I think must have in mind here his own previous treatment of 'AaB & NBaC → AaC' (with 'NAaB & BaC → NAaC')—i.e., our present passage—in which the rejection of a certain understanding of 'of every' is so closely tied up with the adduction of matter. When he speaks here about that "with regard to which the going astray comes about," the words he uses are, καθ' ὃ ἡ παραγωγή γίνεται (145.10–11). The word παραγωγή occurs at just one other place in the commentary: 130.6. (It should not make a difference that at 145.10 Alexander speaks of a negative universal instead of an affirmative: he says at 131.4–7 that the disproof through adduction of matter is the same for the negatives.)

¹⁰⁸ It might be thought that with the words at [12], 'Therefore he does not posit an assertoric proposition' (δίο ὑπάρχουσιν οὐ τίθησιν), Alexander is referring to the major premiss of the syllogism he is discussing (i.e., 'NAaB & BaC → NAaC'). But this (besides making of [12] to [13] an extremely bland observation) attributes no function to the word δίο, which connects this claim with the argument which precedes, [8] to [11].

an assertoric, one is forced to concede that the conclusion is not necessary for nothing would require the necessity of the major to apply to further specifications of the middle term—e.g., the minor term. Therefore (διὸ—130.13), if the conclusion is necessary, besides the major the minor premiss too must be necessary.¹⁰⁹ “For,” as Alexander says in [13], “where that which is predicated of all B of necessity will also hold of necessity of the things under B, there there is necessity.”¹¹⁰ Nothing, of course, demands that the necessity of BaC be anything stronger than hypothetical necessity.¹¹¹

But this suggests that Alexander’s position was not terribly far from that of Theophrastus. This is especially apparent at [6] and [7]. By rejecting the notion that the predicate in an apodeictic proposition applies only to things essentially linked to it, he is saying that these things can be “separated” from the predicate. The Theophrastan language is unmistakable here; and it is language especially reminiscent of Philoponus, in *A.Pr.*124.9–24. Once again, as with ecthesis, Alexander, in his interpretation of Aristotle, has one foot in the Theophrastan camp.

This becomes even more apparent two pages after our present passage—i.e., at in *A.Pr.*132.23–34. Here Alexander mentions Theophrastus by name and says that he argued, on the grounds that the various terms are separable from each other, that ‘AaB & NBaC’ gives a conclusion which is not necessary (AaC). To which Theophrastus adds, says Alexander, that “So also, if the major is necessary. . . . For if someone should thus assume ‘of that of which B so also A <holds> of necessity,’ he assumes both <premisses> as necessary” [in *A.Pr.*132.28–31].¹¹² This can only mean that Theophrastus is rejecting the strong dictum, except insofar as it might be regarded as holding in a syllogism of the form ‘NAaB & NBaC → NAaC.’ Whoever Alexander is arguing against in in *A.Pr.*129–30, it is not Theophrastus.

Let us continue, however, to go through the argument at

¹⁰⁹ Alexander in a number of places says (or presupposes) that a proposition may not wear its mode on its sleeve. See, for instance, in *A.Pr.*26.3–4, 155.10–14, 191.33–192.4. I discuss this issue below and also in chapter 3.

¹¹⁰ We might notice here the use of the future (ὑπάρξει—130.14).

¹¹¹ We shall see below that hypothetical necessity of the requisite type can be quite short-lived—as short-lived, literally, as snow.

¹¹² “ὡσαύτως δέ, καὶ εἰ ἀναγκαῖα ἡ μείζων. . . . ἐὰν γάρ τις οὕτως λάβῃ ‘καθ’ οὗ τὸ B, καὶ τὸ A ἐξ ἀνάγκης ὥσπερ ἀναγκαῖας ἀμφοτέρως λαμβάνει. . . .” Wallies regards this section as direct quotation of Theophrastus. So also does FHS&G: see 106B.

Alexander's in *A.Pr.* 129–130. Alexander's claim at [12]–[13] has been that in 'NAaB & BaC \rightarrow NAaC' Aristotle does not actually posit an assertoric. At [14] he returns to the syllogism discussed in the lemma, 'AaB & NBaC \rightarrow AaC,' and his point is that there is nothing extraordinary about this mood: A holds assertorically of every C by virtue of the standard dictum. At [15], however, he returns to 'NAaB & BaC \rightarrow ?AaC'; and this time he says that if the minor premiss is assertoric, the conclusion will not be necessary. So, once again, he is seen to assert the peiorem rule.

The final statement in this section ([17] "That however a universal assertoric is the hypothesis he has also just now made clear by the terms which he adduced") is also worth commenting upon. There is a definite connection between this remark and the remark we found puzzling when we looked at Philoponus—i.e., in *A.Pr.* 126.26–9: "when, the major being apodeictic and the minor assertoric, he derives a necessary conclusion, he has not had terms to set out deriving necessity proper—from which it is clear, he says, that Aristotle assumed hypothetical necessity."

It is now clear what this all means. [17] pertains (as does [14]) to the mood mentioned in the lemma—i.e., 'AaB & NBaC \rightarrow AaC.' Alexander's point is that Aristotle's mentioning terms in connection with it shows that he definitely has in mind an assertoric as the major premiss. This is a point he needs to pick up on, otherwise someone could object, "if 'NAaB & BaC \rightarrow NAaC' really contains two apodeictics, how do we know that 'AaB & NBaC \rightarrow AaC' does not?" His answer is that Aristotle gives us a signal. If you use terms such as those Aristotle uses to disprove 'AaB & NBaC \rightarrow NAaC (i.e., κ , ζ and α), you show that you intend a normal assertoric in the one premiss. If it were really an apodeictic (i.e., hypothetically necessary), it would be beside the point to adduce in refutation a limiting term like κ .

2.5 *The Arabic evidence*

2.5.1 *Averroes material and On mixed premisses*

We come now to the evidence pertaining to *On mixed premisses* which survives in Arabic sources. This evidence exists (most importantly) in a fragment from Alexander known by the title 'Refutation of Galen's interpretation of the possible' (which I speculate may actually be part

of *On mixed premisses*), two works by Averroes, and (to some extent) al-Fārābī's commentary and short treatise on *De Interpretatione*.¹¹³ I shall consider first the Averroes material, getting to the 'Refutation' and al-Fārābī only eventually.

Obviously, a matter of primary concern is the closeness of the relationship between the Averroes material and *On mixed premisses*. It is fairly clear not only that Averroes did not have direct access to the work but that it had disappeared from the Arabic tradition some time previously, for (if the Latin tradition is to be relied upon) he tells us so: "Et puto, quod haec inquisitio expositionis latuerit omnes praeter Alexandrum, quia non pervenerunt ad nos eius tractatus de his rebus."¹¹⁴ Moreover, as mentioned above, the distance in time must count against the Averroes material, as must its cross-cultural, cross-linguistic transmission. There is also the problem of hostile sources, as we saw above (see note 9).¹¹⁵

On the other hand, there can be little doubt that Averroes' remarks are dependent in some way on *On mixed premisses*. Since we know he had access to Alexander's *in A.Pr.* and since the remarks previous to the above-quoted words are about mixed modal syllogisms, the words "eius tractatus de his rebus" must refer to another work devoted to mixed modal syllogisms. The most likely (perhaps the only) candidate is *On mixed premisses*.¹¹⁶ That we find in question

¹¹³ The fragment called the 'Refutation of Galen's essay on the possible' is found tacked onto an Arabic translation of Alexander's 'Treatise in reply to Galen concerning the first mover' [Rescher (1967), p. 46]. It consists almost wholly of a quotation from Galen. Both the treatise and the fragment have been edited and translated by N. Rescher and M.E. Marmura [Rescher and Marmura (1967)]. Gutas gives most of the fragment at FHS&G 100C, and in what follows I use his translation. An English translation of the fragment is also found at Rescher (1967), p. 48. The commentary by al-Fārābī on *Int.*, edited by Kutsch and Marrow [Kutsch and Marrow (1960)], has been translated by Zimmermann [Zimmermann (1981)]. The al-Fārābī treatise, also translated by Zimmermann (in the same work), was edited by M. Küyel-Türker [Küyel-Türker (1966)]. A useful bibliography devoted to al-Fārābī is Rescher (1962).

¹¹⁴ Averroes (Balmes), *Quaesita lib.pr.*, 100D. The remark pertains to *An.Pr.* 35a35ff. The question from which this remark is drawn does not appear in 'Alawī (see above, note 14). The remark does, however, appear both in Balmes (as cited here) and in Elia: "Et puto quod intentio huius declarationis occulta fuit omnibus exposterioribus [*sic*], nisi forte Alexandro, nam verba eius de his non pervenerunt ad nos" [Averroes (Elia), *Quaesita lib.pr.*, c.2.v].

¹¹⁵ Perhaps, though, this factor should not be exaggerated. Al-Fārābī apparently knew enough which was positive about *On mixed premisses* to take Alexander's side in the issues which were raised there: see Rescher (1963a), p. 98.

¹¹⁶ If we exclude the logical scholia mentioned at *in A.Pr.* 250.2 (see above, n. 8) and the 'Refutation of Galen's essay on the possible' (to be discussed below).

4 a tell-tale passage in which the missing source is mentioned and opposing sides in the controversy are set out is enough for us to identify “eius tractatus de his rebus” with *On mixed premisses*:

We say: According to what we find in the book of Themistius and to what Abū-Naṣr (al-Fārābī) reported, two opinions have been transmitted to us from the commentators about this (premiss). One is the doctrine of Theophrastus, Eudemus and Themistius, and the other the doctrine of Alexander and subsequent commentators, except Themistius.¹¹⁷

Also pertinent is the fact that there is in Averroes information which is not found in Alexander’s *in A.Pr.*—information relating to the positions held by Theophrastus and Eudemus regarding the nature of assertoric propositions, such as only Alexander could have relayed. Since Averroes tells us repeatedly that there is an Alexandrian source besides *in A.Pr.*, we can conclude that this other information originated there. And since the information (as we shall see) is very much bound up with the mixed modal syllogistic, we can conclude with some confidence that this other source is *On mixed premisses*.

2.5.2 *Evidence in Averroes’ Questions*

One of the most interesting facts to be derived from Averroes’ logical *Questions* is that *On mixed premisses* was concerned to a significant extent with the nature of assertoric propositions. I quoted just above a remark from Averroes’ fourth question in which he sets out the sides in the dispute. This setting out of the opposing camps (as well as the general contents of question 4) is good indication that we are in contact with a tradition dependent on Alexander’s *On mixed premisses*. Immediately before that quotation, as the first sentence in the question we read: “Our purpose in this essay is to enquire into the premiss which is called existential or absolute: what it is and what Aristotle’s

¹¹⁷ FHS&G 98B. Rescher [Rescher (1963a), p. 95] notes a serious mistake by Balmes, who understands Themistius and Eudemus to be opposed to Theophrastus (see Averroes (Balmes), *Quaesita lib.pr.*, 78DE). Elia puts Theophrastus with Themistius but instead of Eudemus has Herminius: “Et sicut narravit Alfarabius, sunt duae opinionones. Una earum est opinio Herminii & Themistii & Theophrasti. Secunda est opinio Alexandri & posteriorum expositorum post ipsum” [Averroes (Elia), *Quaesita lib.pr.*, a.1.r.]. This may be no “slip of the pen”: we shall see Herminius mentioned again below. Still, caution is called for here. Note the (similar?) scribal error at FHS&G 98D (see especially n. 1).

doctrine about it is, for the commentators have disagreed about this matter."¹¹⁸

This might strike one as unusual, since all our other information would suggest that *On mixed premisses* is about the peiorem (or anti-peiorem) rule. But actually, as we shall see more clearly shortly, the nature of the assertoric proposition is precisely the point of contention in these debates concerning Aristotle's controversial syllogism, 'NAaB & BaC \rightarrow NAaC.'¹¹⁹ This debate—and question 4—shall occupy a large part of our attention in the present section.

So, Averroes has already mentioned that there were two sides to the debate. He continues:

The doctrine of Theophrastus is the following: an absolute and existential premiss is one from which have been omitted both the mode of possibility and the mode of necessity, neither one having been explicitly stated in it, while the matter in itself is either necessary or possible. According to these people, then, an existential premiss is a premiss without modality, being, as it were, like the genus of necessary and possible premisses, genus since, in accordance with its matter, it is disposed to have added to it one of these two modes. This is the doctrine of the ancient Peripatetics about absolute premisses.

Alexander and the later commentators are of the opinion that an existential premiss is a possible premiss when it actually exists, that is, when the predicate actually belongs to the subject, namely in the present time.¹²⁰

It is important to be clear about what is at issue between Alexander and Theophrastus. One might think that the difference is that the latter thinks that an assertoric proposition appearing in a syllogism is ambiguous (in that it might turn out to be either contingent or necessary) and that the former denies this. But actually, as we have already seen and as we have indication once again here, the two are agreed on that. The issue between them rather is whether the

¹¹⁸ FHS&G 98B. On the meaning of 'absolute,' see FHS&G 106I, including note 1. The word translates ἀπλῶς, particularly as used at Aristotle's *An.Pr.*34b8. Note that at *in A.Pr.*128.27 and 28 Alexander use the word ἀπλῶς to pick out the assertoric insofar as it involves no further modal specification.

¹¹⁹ Since *On mixed premisses* is to a considerable extent about assertoric premisses, the reference to Alexander in al-Fārābī's 'Short Treatise on Aristotle's *De Interpretatione*' [Zimmermann (1981), p. 243] is probably a reference to *On mixed premisses*. Mignucci also argues that there is a close connection between Theophrastus's espousal of the peiorem rule and his understanding of assertoric and problematic propositions [Mignucci (1965b), pp. 34ff].

¹²⁰ FHS&G 98B.

ambiguity is to be resolved by considering the subject matter to which a proposition refers.

Or, more precisely, whereas Theophrastus's inclination is to look to the concrete world—or, at least, to something conceived of as outside logic—in order to determine the mode of the assertoric premiss in 'NAaB & BaC \rightarrow ?AcC,' Alexander sees the problems inherent in this procedure.¹²¹ As he says at *in A.Pr.*26.29–27.13, if one allows that propositions take their necessity, actuality or contingency "from what underlies them and is meant by them,"¹²² it would be impossible to be in error in attributing to them a mode:

For there would be no false utterances if something were only called an utterance if it signified the nature of the objects and were of the same kind as the things it signified. But we say that assertoric utterances admit both truth and falsity. Thus, just as we say that some <assertoric> affirmative <propositions> are true and others are false (namely, those that do not describe their subjects as they are), so we shall also say that some necessary propositions are false. False necessary propositions will be those which say that what is not necessary is necessary.¹²³

Alexander, unlike Theophrastus, is concerned with what a proposition actually *is*. That is, according to Alexander, the propositions with which a logician deals are not indeterminate (in the sense that Theophrastus would suggest).¹²⁴ they are genuine propositions, such as we find in everyday arguments. As such, they contain concrete terms. We can resolve the ambiguity of, for example, 'NAaB & BaC \rightarrow ?AaC' by attending to the terms A, B and C.¹²⁵

¹²¹ For a discussion of this point, see Maiolus (1497b), a.4.v. Philoponus has this same notion of the assertoric as indeterminate between apodeictic and problematic: see Philoponus, *in A.Pr.*44.6–7, 24–26.

¹²² οὐ γὰρ ἀξιοὶ τὰς προτάσεις ἀπὸ τῶν ὑποκειμένων καὶ δηλουμένων ὑπ' αὐτῶν λαμβάνειν τὸ ἀναγκαῖον (27.1–2). On Alexander, *in A.Pr.*26.29–27.5, see Zimmermann (1981), p. 243, n. 1.

¹²³ *in A.Pr.*27.6–12. Note that he does not say that false necessary propositions include those which do not say of something which is necessary that it is necessary. See above, note 109.

¹²⁴ FHS&G 98C.

¹²⁵ In effect, I am arguing here that Alexander held that the assertoric proposition in 'NAaB & BaC \rightarrow ?AaC' is definitely either apodeictic or contingent-actual—which two exclude each other. Alexander would not deny that an apodeictic proposition in some sense implies an assertoric. He says at *in A.Pr.*26.3–9 that what distinguishes an apodeictic from an assertoric proposition is that the former is true for all times—and he was well aware, of course, that all times include "this" time [FHS&G 98B; see also Maiolus (1497b), a.2.r]. But he also held that an assertoric

There is also a second (connected) point at issue between Alexander and Theophrastus. Alexander claims that Theophrastus holds that the assertoric proposition in, for instance, 'NAaB & BaC \rightarrow ?AaC' is a genus "from which have been omitted both the mode of possibility and the mode of necessity, neither one having been explicitly stated in it."¹²⁶ The conception of 'genus' that Alexander is working with in the above quotation (and attributing to Theophrastus's assertorics) we might call a "conventionalist" one.¹²⁷ According to this understanding, a genus is nothing at all over and above the species it contains. An assertoric proposition then would be a mental category imposed on material which is either apodeictic or contingent. Alexander's alternative to this idea is that a form (such as we might conceive the assertoric to be) contains potentially all that is found in the realized proposition, which is composed of a form and

is essentially different from an apodeictic in that it is composed of terms referring to contingent matter, and thus an apodeictic could no more imply an assertoric than (in Aristotle) a proposition about the stars could imply one about how many people are sleeping down below them (see Simplicius, in *Cael.*, 344.14–17). In modern logical terms this is all quite incomprehensible: see Barnes et al (1991), p. 79, n. 157. On the issue of the relationship of the assertoric to the necessary, see also al-Fārābī's 'Short Treatise on Aristotle's *De Interpretatione*' [Zimmermann (1981), p. 243], where al-Fārābī is possibly attributing to Alexander the opinion that the assertoric shares "being actually the case . . . with the necessary." Alexander also speaks of the assertoric as definitely not necessary at in *A.Pr.*189.33–36. Alexander's position on this seems to have been the focus of attack by his later critics (including Themistius), who accused him of reducing the assertoric to *too* temporary a thing. They used against him *An.Pr.*34b7, where Aristotle states that the assertoric he employs in certain mixed problematic syllogisms will not be limited κατὰ χρόνον. But Averroes is certainly right in suggesting that these people misinterpreted Alexander [Rescher (1963a), p. 102]. Alexander's treatment of *An.Pr.*34b7ff (in *A.Pr.*188.18–191.18) makes it apparent that he accepted the idea that an assertoric could, and in certain syllogistic circumstances should, be true for an extended period of time. This does not mean, however, that it can remain true forever [in *A.Pr.*189.33].

¹²⁶ Averroes attributes this position (or something much like it) to Theophrastus at *Questions* 6, p. 148 [see FHS&G 98E]. On this issue of the assertoric as further specifiable as either necessary or contingent, see Mignucci (1965a), pp. 241–3. Mignucci's interpretation of Aristotle is very similar to Alexander's although his objection to the notion of the assertoric as a genus is that it makes the necessary and the contingent contraries instead of contradictories.

¹²⁷ Averroes (who is in general agreement with Alexander) regards Theophrastus's assertoric as insufficiently concrete. At *Questions* 4, we are told that, "According to the opinion of the first party, that is, the opinion of Theophrastus, an absolute premiss exists only in the mind" [FHS&G 98B]. This understanding of the assertoric as a genus is attributed also to Themistius by Averroes at the latter's *Middle Commentary*, p. 200: "For this premiss, that is, the absolute with such a nature, does not exist outside the mind . . ." [FHS&G 98G]. This remark has reference to *An.Pr.*34b7–8 (see above, note 118).

its appropriate corresponding matter (or what we might call “term-matter”). These ideas (and those surveyed in the previous paragraph) will play a large part in chapter 3, so I shall not anticipate those arguments anymore here.

Allow me, however, to review matters. Like Theophrastus, Alexander allows that what holds always (i.e., what is necessary) may occasionally not be taken as such (εἰ μὲν ἀεὶ ὑπάρχοι τὸ ὑπάρχειν λεγόμενον καὶ οὕτως λαμβάνοιτο ὑπάρχειν— in *A.Pr.*26.3–4).¹²⁸ But, when determining what the true character of an apparently assertoric proposition might be, instead of looking to the concrete world, he looks to the propositions themselves or, more precisely, to the matter which makes up their terms. If the terms used indicate that the proposition is actually an apodeictic one, he holds, one should treat the proposition as such. If, on the other hand, the terms do not reveal a necessary proposition, the proposition is an assertoric one. If the proposition in question is the minor in a syllogism of the form ‘NAaB & BaC → ?AaC,’ the conclusion will be AaC, not NAaC.

All this has at least two important consequences. First, our usual conception of Theophrastus as a *strict* advocate of the peiorem rule is slightly wrong. According to the present understanding, the combination ‘NAaB & BaC’ does, even according to Theophrastus, sometimes conclude to ‘NAaC,’ provided that the minor refers to a fact that is necessary. We are confirmed, therefore, in believing that Philoponus’s speaking of “genuine parts” at in *A.Pr.*124.16–24 was not inadvertent. His remarks represent a more accurate transmission of Theophrastus’s position than what appears in pseudo-Ammonius.¹²⁹

But what, someone might ask, of the remark in Alexander (in *A.Pr.*124.8–13) where he says that Theophrastus insisted that in every combination made up of a necessary and assertoric proposition the conclusion follows the “lesser” or the “worst” of the two premisses?

¹²⁸ This possibility appears also to be presupposed at Alexander, *Conv.*, p. 77. There Alexander says first of all that the subject of ‘man laughs of necessity’ should be regarded as a universal, on the principle that such propositions are always “increased in categorization” (i.e., from indefinite to universal rather than particular). Then he adds: “So it is necessary that our saying ‘of necessity’ in the conversion of this proposition is also increased in categorization, except that, in the propositions in which no doubts fall on the manner indicating the existence, there is <never> an addition to the predicate.” (The word ‘never’ here is in pointed brackets due only to the fact that the Arabic text contains a word which means never when it is used with a negative particle which is wanting in this instance, thus leaving the remark obscure. I am grateful to Robert Hoyland for this information.)

¹²⁹ {Ammonius}, in *A.Pr.*39.7–10. See above section 2.3.

Well, as we saw, there is reason to believe that Alexander agreed with this. Not only does he say *τοῦτο εἰκότως γίνεσθαι δοκεῖ* immediately after this statement of the peiorem rule (i.e., at 124.31), but he too holds that if the minor is assertoric the conclusion must be assertoric. If however the minor is *really* an apodeictic one, for the conclusion to be apodeictic is not a violation of the peiorem rule.

Secondly, our understanding of *in A.Pr.*125.3ff must be revised slightly. As we have seen above, the passage has been regarded by Moraux as discussing Herminus without naming him.¹³⁰ If the Arabic sources are at all reliable, this passage must refer at least as much to Theophrastus as it does to Herminus. This indeed would explain not only the failure to mention Herminus in *in A.Pr.*125.3ff but the οὖν at 125.3, which certainly appears to tie this passage (rejecting considerations of matter) with the immediately preceding passage, that discussing Theophrastus and the peiorem rule. We might also call attention once again to the fact that Elia, unlike Rescher and Balmes, includes in his depiction of “the sides” Herminus.¹³¹ Someone, perhaps even Averroes, thought it right to put Herminus in the same camp with Theophrastus in precisely this controversy.

2.5.3 *The nature of the necessary*

We come back to the issue which occupied us at such length above: the nature of the necessary. I shall examine first the fragment of Alexander’s ‘Refutation of Galen’s essay on the possible’ of which I spoke above, for it contains important information about Alexander’s understanding of the various types of necessity. This discussion will carry us to a final assessment of Philoponus’s reports concerning hypothetical necessity.

2.5.3.1 *The ‘Refutation’ fragment*

I give the central argument of fragment as it is translated by Gutas:

Galen said: The meaning understood by the term ‘necessity,’ even though present in the two statements together—that is, in the statements ‘The sun illuminates of necessity’ and ‘man is endowed with speech also of necessity’—is one and the same. The reason is that the term ‘necessity’ in both these statements refers only to the fact of the inseparable

¹³⁰ Moraux (1984), pp. 391–3. See also above, note 48.

¹³¹ See note 117.

existence of light in the sun and of speech in man. The party of Theophrastus erred with regard to the *differentia* which exists between the two things posited as subjects in these two premisses and transferred it (the *differentia*) to the unknown¹³² that is predicated of them jointly: Since the sun is eternal <and consequently its light is eternal, and since man perishes and> consequently speech perishes along with him, they imagined that the necessary also subsumes two meanings.¹³³

It has a number of times been suggested (i.e., by Bürgel and von Müller) that *On mixed premisses* was written against Galen.¹³⁴ We know through Maimonides that al-Fārābī, a defender of Alexander, began his Great Commentary on *An.Pr.*, which was especially concerned with modality, with a polemic against Galen.¹³⁵ Here we have a fragment of a work by Alexander without a proper title: what appears at the beginning of the fragment is more of a description than a title¹³⁶—a description which would correspond to something which was surely discussed in *On mixed premisses*.¹³⁷ The fragment discusses Galen's views regarding modal concepts and mentions Theophrastus and his followers (whom we know to have been discussed in *On mixed premisses*) and, in particular, mentions Theophrastus's view that the necessity which characterizes the subject matter to which a premiss refers determines the modality of the proposition itself. The fragment introduces, as well, an issue we know from Philoponus (*in A.Pr.*126) to have been discussed in *On mixed premisses*: hypothetical

¹³² For this concept, see Rescher (1963b), pp. 93–98, 108–111. There we learn that to “transfer to the unknown” occurs when “it is known by sensation that a certain ‘matter’ is in a certain condition . . . and so the intellect consequently transfers this condition . . . from this [known] matter to some other [unknown] matter similar to it . . .” (p. 93). The idea in the present context would be that Theophrastus (and company) erringly transfer characteristics which hold of the various objects of discourse to the concept (i.e., ‘necessity’) which is said of them. See also Zimmermann (1981), pp. 227ff.

¹³³ FHS&G 100C. The fragment continues for a few sentences beyond what I have given here, Galen arguing that it is as if the school of Theophrastus noticed that ‘sensitive’ (or “having sensation”) applied sometimes to tall things, short things, etc., and concluded from this that ‘sensitive’ has various corresponding senses. See Rescher (1967), p. 48 and Rescher and Marmura (1967), pp. 69–70. What appears in pointed brackets is supplied by Gutas to fill a lacuna in the text.

¹³⁴ See Bürgel (1967), p. 283, n. 1. He's relying on I. von Müller (1897) for this.

¹³⁵ See above, note 10.

¹³⁶ The heading runs simply: “Refutation of Galen's Essay on the Possible” [FHS&G 100C]. It appears in the *Fihrist* of al-Nadīm but not in any Greek source [Rescher and Marmura (1967), p. 1].

¹³⁷ See note 125 for arguments against Alexander (in connection with *On mixed premisses*) that his understanding of the assertoric made it too short-lived a thing.

necessity. It also mentions, like the Philoponus account, the fact that Theophrastus was concerned with different senses of the word ‘necessary.’¹³⁸ On the basis of these data, then, I suggest that we are dealing here with a fragment of *On mixed premisses*. But even if I am incorrect in this, there is no doubt that we can learn from this fragment something about the approach Alexander would have taken to grades of necessity.

2.5.3.2 *Alexander on grades of necessity*

Alexander did not hold Galen in high esteem as a logician (although he respected him as a scientist).¹³⁹ We know from the above description (or title) that he disagreed with him about modal concepts.¹⁴⁰ We can be fairly sure, therefore, that Alexander drew this long quotation from Galen in order to refute it. It is obvious, however, that he would not have attacked Galen’s contention that Theophrastus looked to the concrete world in order to determine the modality of a proposition, since he was equally offended by this. Probably what he did, therefore, was defend the Theophrastan idea that there are various senses of the word ‘necessary.’

We find him doing just this in scattered passages in *in A.Pr.*¹⁴¹ The first major one occurs at *in A.Pr.*36.25–32:

Since what is necessary either is necessary *simpliciter* or is called necessary with a limit, e.g., ‘Man holds by necessity of every grammarian so

¹³⁸ Philoponus, *in A.Pr.*124.9–11. The word Philoponus uses, as we saw, is σημασίας (124.11). Philoponus actually says that Theophrastus and his allies were concerned with the meanings of necessity and the assertoric, which perhaps establishes another connection between the Galen fragment and *On mixed premisses*.

¹³⁹ “There are accounts in Arabic sources of a confrontation between Alexander and Galen in Rome in which the former called the latter ‘mule-head,’ but these may result from a confusion between Alexander of Aphrodisias and another Peripatetic, Alexander of Damascus” [Sharples (1987), p. 1179]. Nutton discusses whether the alleged dispute between Alexander and Galen was historical, his conclusions being a tentative yes. Alexander, says Nutton [Nutton (1987), p. 46], thought Galen “worthy to be placed with Plato and Aristotle among the *endoxoi*, presumably for his medicine, but Alexander’s attitude toward his philosophy is vastly different.” Alexander speaks highly of Galen at *in Top.* 549.23–4. See also Nutton (1984), pp. 318–24; Nutton (1987), pp. 45–51; Zimmermann (1976), *passim*; Zimmermann (1981), p. lxxxii, n. 2; Barnes et al (1991), p. 2, n. 9.

¹⁴⁰ See his words at *in A.Pr.*156.29–157.1: λέγων περὶ τῶν τοῦ ἀναγκαίου σημαينوμένων—and also note 146, below.

¹⁴¹ On these passages see Graeser (1973), F14. See also Sharples (1978), pp. 90–1. We have already examined, of course, *in A.Pr.*140–1. Other places in *in A.Pr.* where Alexander talks about one or other type of necessity include: 155.20–30, 179.34–180.1, 201.3–24, 251.19–22.

long as he is a grammarian' (this proposition is not necessary *simpliciter*—Theophrastus showed the difference between them—for there are not always grammarians and men are not always grammarians)—since then <as I say> they differ, we must recognize that Aristotle is here [i.e., in the section dealing with the simple conversion] discussing what is necessary *simpliciter* and in the strict sense. It is necessary propositions of this sort which convert.

Note that here the “other” sense of necessity, although *called* necessity (ἀναγκαῖον . . . μετὰ διορισμοῦ λέγεται—36.26), is probably not the type that Alexander would regard as making a premiss or a conclusion apodeictic. It is mere limited necessity. At *in A.Pr.*251.11ff (and, in particular, lines 20–1), he says that a proposition characterized by this sort of necessity is assertoric.¹⁴² (One of the propositions he mentions in this connection is ‘sleep holds [necessarily] of no awake horse.’) He says a similar thing at *in A.Pr.*155.20–25, where the conclusion ‘Every walking thing moves’ is identified (rather dismissively) as necessary “with the limit ‘while it walks.’”¹⁴³ It is not, he says, ἀναγκαῖον ἀπλῶς.¹⁴⁴

A second passage occurs at *in A.Pr.*156.27–157.2. In it Alexander discusses Aristotle’s definition of possibility at *An.Pr.*32a18–20: λέγω δ’ ἐνδέχεσθαι καὶ τὸ ἐνδεχόμενον, οὐ μὴ ὄντος ἀναγκαίου, τεθέντος δ’

¹⁴² The passage concerns *An.Pr.*40a36–38. In the latter passage Aristotle remarks that the combination ‘MAaC & NBeC’ is not syllogistic, and he adduces terms for “deducing” as disproof both an e- and an a-proposition as conclusion: sleep (which we shall call υ = ύπνος), sleeping horse (ι^ε = ἵππος καθεύδων), man (α = άνθρωπος); sleep again (υ), waking horse (ι^ε = ἵππος ἐγρηγορώς), man (α) [see *in A.Pr.*251.14–19]. Thus, we have two “syllogisms”: [a] ‘Mυαα & Nι^εα → ναι^ε’ and [b] ‘Mυαα & Nι^εα → νει^ε.’ Alexander says that, “It is necessary to know that the conclusions proved are not necessary *simpliciter* but with a limit—such as are assertoric” [δεῖ δὲ εἰδέναι, ὅτι τὰ συμπεράσματα οὐχ ἀπλῶς ἀναγκαῖα τὰ δεδειγμένα ἀλλὰ τὰ μετὰ διορισμοῦ, ἃ ὑπάρχοντά ἐστι—in *A.Pr.*251.19–21]. Alexander in his exposition at first identifies the conclusion of [a] as necessary (*in A.Pr.*251.16). He does not refer to the conclusion of [b] as necessary [*in A.Pr.*251.19], although he could just as well have. But it is very clear that he does not regard either of these conclusions as necessary except in the weakest (hypothetical) sense. For this passage is actually a criticism of Aristotle’s adduction of terms. These two conclusions are assertoric, he says, and assertoric propositions are sufficient to cancel necessary and assertoric conclusions but not problematic conclusions. (Alexander goes on then to derive the non-Aristotelian mood ‘MAaC & NBeC → MAeB.’)

¹⁴³ Alexander considered the “necessity” involved in a proposition about a past event (such as ‘there was a sea-battle yesterday’) quite an exceptional case of the necessary (Alexander, *Fat.*177.7–178.7). He would surely have been even less eager to accept as truly necessary a proposition like ‘walking things necessarily move while they move.’

¹⁴⁴ See also *in A.Pr.*180.1 and 201.22–4.

ὑπάρχειν, οὐδὲν ἔσται διὰ τοῦτ' ἀδύνατον. His particular task here is to explain the words, οὐ μὴ ὄντος ἀναγκαίου ('of that which is not necessary'). The following, he says, is one possibility:

Or perhaps by saying 'of that which is not necessary' he has taken away from it [i.e., the problematic] the assertoric. For necessity is predicated according to him¹⁴⁵ also of the assertoric. For what holds of something necessarily holds of it—while it holds. At any rate, Theophrastus in the first book of *Prior Analytics*, speaking of what is signified by 'necessity,'¹⁴⁶ writes: 'Third is the assertoric, for when something holds it is not possible then for it not to hold.'

Important here is the word 'third,' in the quotation from Theophrastus: "Third is the assertoric, for when something holds it is not possible then for it not to hold." This third type of necessity is quite clearly what I have been speaking of as limited necessity. Here too Alexander seems to stand aloof from it, explaining that the assertoric can be considered necessary—"At any rate [γούν—156.29],¹⁴⁷ Theophrastus, speaking in the first book of his *Prior Analytics* about what is meant by 'necessary' writes . . .". But the important thing is the implication that Theophrastus identified two other types of necessity beyond limited necessity. What were they?

We have already seen that at *in A.Pr.* 141.1–6 Alexander assents to the distinction "made by [Aristotle's] disciples" (141.1–2) among types of necessity. But in his comments just previous to this, where he demonstrates, as we have seen, acceptance of the basic idea behind what some exegetes had called 'limited necessity' (i.e., acceptance of the idea that there exists a sort of necessity which involves a temporal limitation), it is clear too that he does not much like this termi-

¹⁴⁵ Wallies has found αὐτοῦ (KM) and αὐτοῦς (a) and emended to αὐτὸν. Another possibility would be to read καθ' αὐτό, giving, κατηγορεῖται γὰρ καθ' αὐτό καὶ κατὰ τοῦ ὑπάρχοντος τὸ ἀναγκαῖον [*in A.Pr.* 156.27–8]. According to this reading (quite convenient for our present purposes), Alexander would be saying here that necessity is predicated both καθ' αὐτό (as at *An.Post.* I,4) and of the assertoric.

¹⁴⁶ λέγων περὶ τῶν τοῦ ἀναγκαίου σημαινόμενων—156.29–157.1. (It is obvious here, incidentally, that Alexander does not share Galen's objections to identifying different senses of 'necessary'.)

¹⁴⁷ γούν, although it could mean 'thus,' is commonly translated 'at any rate' or 'at all events'—see, for instance, FHS&G 100B. Alexander uses it often. The first ten times he uses it in *in A.Pr.*, it has this mildly adversative character (like γέ), suggesting unwillingness or reluctant concession (often at the beginning of a construction which might be translated 'true: . . . but . . .'). See 3.18; 11.15; 17.30; 18.30; 20.2; 21.6; 28.13; 29.9; 32.25, and 33.22. The eleventh occurrence (35.18) should probably be emended (with L) to γάρ.

nology, which connects the necessity of the “assertoric” premiss in ‘NAaB & BaC \rightarrow NAaC’ with the relative necessity spoken of at *An.Pr.*30b33.

As I have already suggested, what Alexander in effect does is to suggest other terminology which allows him speak of types of hypothetical necessity stronger than limited necessity, for after issuing his approval of the distinction in general (which he says Aristotle too makes at *Int.*19a23–4, where Aristotle says that “what is, necessarily is, when it is; and what it is not, necessarily is not, when it is not”),¹⁴⁸ he calls this additional variety of necessity not limited but hypothetical necessity.¹⁴⁹ He does not deny that limited necessity is necessity, for Aristotle’s words at *Int.*19a23–4, if anything, pick out the latter type of necessity. But he wants something stronger for ‘NAaB & BaC \rightarrow NAaC.’

Now, the strongest type of necessity (Theophrastus’s first type) would obviously be necessity which holds at all times, regardless of circumstances and contingent facts.¹⁵⁰ In no sense might this be called hypothetical. The second type must, therefore, be hypothetical and yet more truly necessary than limited (hypothetical) necessity, which is necessity merely, as Philoponus puts it, “while the predicate holds.”¹⁵¹ The obvious candidate is the necessity that Galen identifies in the above fragment: that involved in propositions like ‘man holds of Socrates.’ This is necessarily true, but the “fact” lasts only so long as Socrates does. This is Philoponus’s necessity “while the subject holds.”¹⁵²

¹⁴⁸ See in *A.Pr.*141.3–6.

¹⁴⁹ τὸ γὰρ ἐξ ὑποθέσεως ἀναγκαῖον τοιοῦτόν ἐστι—141.6.

¹⁵⁰ See in *A.Pr.*179.33–180.1. At Simplicius, in *Cael.*359.11ff, we learn that he also regarded propositions like ‘2 + 2 = 5’ impossible in the strictest sense. In the former passage Alexander perhaps overstates the case, suggesting that necessity *simpliciter* is always eternal necessity: εἰ δὲ ἀπλῶς, ἐξ ἀνάγκης καὶ αἰεὶ—179.34. But there are ways of construing ‘eternally’ which do not demand that it refer only to propositions like ‘the sun moves.’

¹⁵¹ Philoponus, in *A.Pr.*126.11, 16. See also Alexander, in *A.Pr.*156.28–9 and Sharples’ criticism of Rescher’s translation of the latter: Sharples (1978), p. 90 (and Rescher (1967), p. 47).

¹⁵² Similarly, at Ammonius, in *Int.*153.15–19, in a comment on *Int.*19a23ff, we find a two-fold division of necessity simpliciter: i.e., into (1) the eternally true (as in ‘the sun moves’ or ‘the sum of the angles of a triangle is equal to two right angles’), and (2) that which is true as long as the subject exists (as in ‘Socrates is a man’). Limited necessity is said to characterize that which is true while the predicate holds. This commentary is heavily reliant on Alexander’s lost commentary on the same work.

And there is other evidence besides. First, in his treatise on the conversion of propositions, Alexander appears to say that the proposition ‘Man holds of all who laugh’ is assertoric insofar as “it is taken on the basis that the laughers exist” but necessary “insofar as man is not separate from the one who laughs.”¹⁵³ Second, in his *De Fato* Alexander says that the proposition ‘snow admits heat’ is necessarily false, although such propositions are typically adduced as examples of propositions containing subjects that go out of existence.¹⁵⁴ Third, at *in A.Pr.*201.3–24 Alexander suggests that in order to reject problematic propositions, one needs a universal affirmative and a universal negative which are necessary ἀπλῶς and worries (at 201.21–24) that with propositions such as ‘motion belongs to every walking thing’ he does not really have this (since this is only necessary ἔστ’ ἂν περιπατῇ—201.23).¹⁵⁵ But the implication of this remark is that a proposition like ‘snow is white’ (which he has mentioned just previously) would not be of limited but of ἀπλῶς necessity—or, at any rate, of a stronger variety than that involved in ‘motion belongs to every walking thing.’ Finally, in his commentary on the *Metaphysics*, Alexander discusses the way in which essential properties inhere in a subject, essential properties inhering, of course, necessarily. He speaks quite openly of these inhering ἔστ’ ἂν ἡ σωζόμενον τὸ πρᾶγμα τὸ ὑποκείμενον καὶ μὴ ἐφθαρμένον [*in Metaph.*310.14–5].¹⁵⁶ (He goes on to use an example, Socrates’ form [εἶδος—310.18] inhering in Socrates.) But, as we have seen, this phrase ἔστ’ ἂν ἡ is invariably used—in Alexander, Philoponus, and pseudo-Ammonius—when speaking of hypothetical necessity.

All this corroborative evidence could be added to.¹⁵⁷

¹⁵³ Alexander, *Conv.*, p. 75.

¹⁵⁴ *Fat.*175.20. See also Sharples (1978), p. 90.

¹⁵⁵ See above, note 142.

¹⁵⁶ A similar passage is *in Metaph.*285.14–5.

¹⁵⁷ No doubt study of Arabic logicians will turn up further corroborative evidence. Some is to be found, indeed, at the end of Averroes’ *Questions* 4. There he sets out a five-part division of the necessary which he attributes to Avicenna. The first two parts correspond to Alexander’s strong and hypothetical (but not limited) necessity; the third, fourth and fifth to lesser types. Then Averroes reports that Avicenna says, “Some hold that the absolute [premiss] is the last three [of the five enumerated above] to the exclusion of the first two, while the necessary [premiss] is the first two.” “I reckon,” says Averroes, “that he [Avicenna] is referring here to Alexander and those who follow his views” [Dunlop, D.M. (1962), p. 32; see also Rescher (1963a), p. 93, 103–4, and Rescher (1967), p. 33]. I am grateful to Dimitri Gutas for this translation.

2.5.3.3 *Philoponus a plurimis naevis vindicatus*

We are in a position now to pass a more informed judgement upon Philoponus's report concerning *On mixed premisses* at his *in A.Pr.* 126.7–29. We find in Philoponus much that is consistent with what we have discovered (primarily) in Alexander's *in A.Pr.* and the Arabic commentators. We find in him, first of all, a three-fold division of necessity, the highest type being that involved in a proposition like 'the sun moves,' the second type that involved in a proposition like 'Socrates is an animal,' the third type that involved in a proposition like 'the sitting man sits.' It is true: he seems here to separate necessity *simpliciter* from the higher grade of hypothetical necessity, whereas our other evidence suggests that Alexander understands the two highest types of necessity as both necessity *simpliciter*. But Philoponus also says that the stronger type of hypothetical necessity ("while the subject holds") "comes closer to the proper sense of necessity."¹⁵⁸ I do not think that Alexander's considered opinion would have been very far from this.

Second, we find in Philoponus the idea that Aristotle's mentioning of terms with regard to ' $AaB \ \& \ NBaC \rightarrow AaC$ ' but not ' $NAaB \ \& \ BaC \rightarrow NAaC$ ' is indicative of how he approaches the Theophrastan problem. If I am correct, then, about how the mention or non-mention of terms has a bearing on this problem, he has too the notion of hypothetical necessity, evidence for which we find at (among other places) Alexander's *in A.Pr.* 130.23–4 and 140.25–28.

These correspondences are enough for us to characterize Philoponus as quite a reliable source—certainly better than pseudo-Ammonius. There are, however, some ways in which Philoponus's report does not correspond precisely with what we have discovered in our other sources. The root difficulty is the remark I described above as possibly involving an internal implausibility.¹⁵⁹ Philoponus says that the major premiss of ' $NAaB \ \& \ BaC \rightarrow NAaC$ ' is necessary in the strongest sense, the conclusion necessary in the weakest. This was difficult to account for on two grounds: 1) strictly interpreted, it very artificially restricts the sort of terms that might come into a syllogism of this form; 2) the conclusion would be of a very weak type of necessity. Neither of these problems has disappeared in the course of the present investigation.

¹⁵⁸ Philoponus, *in A.Pr.* 126.14–15.

¹⁵⁹ See above, p. 64.

It might be thought that it is possible to reconcile everything by, first, not taking Philoponus to be ruling out of the lowest category of the hypothetically necessary less contrived propositions and by, second, resurrecting the idea that Alexander disagreed with Sosigenes on more than simply the association of the relevant necessity with *An.Pr.*30b33.¹⁶⁰ But this runs into a number of problems, among which would be the following. First, Philoponus would supposedly have known Alexander's criticism of Sosigenes and yet would here be espousing the latter's solution to the Theophrastan problem without further comment. Second, Alexander gives a positive account of what Sosigenes calls limited necessity at *in A.Pr.*140.25–8—an account which is capable of dealing with the Theophrastan problem by employing a type of necessity distinguishable from the relative necessity of *An.Pr.*30b33. Third, Alexander uses this same account at *in A.Pr.*129–30, where he deals with the Theophrastan problem (see, especially, 130.23–4). Fourth, this account employs the idea definitely attributed to Sosigenes at Philoponus, *in A.Pr.*126.27–9: i.e., that Aristotle's mention or non-mention of term-matter is of key importance.¹⁶¹

I would conclude, therefore, that Philoponus (or, perhaps, a source which he used) has gotten Alexander wrong. When he says that the conclusion to 'NAaB & BaC → NAaC' is necessary "while the predicate holds," perhaps he is alluding to the fact that, with hypothetical necessity of the requisite sort, there being a conclusion at all depends on one's understanding of the major term's modal compass. (The requisite sort of hypothetical necessity would stipulate that what might fall under the minor term at a later time is not to be considered subject matter of the presently proposed syllogism.) In any case, however, the conclusion of 'NAaB & BaC → NAaC,' according to Alexander and Sosigenes, must be at least of the second type: necessity "while the subject holds."

This requires our understanding the necessity involved in the conclusion (and, in fact, minor premiss) of, for instance, 'Nζαα & αακ → Nζακ' as hypothetical necessity "while the subject holds." But this is much more acceptable than its alternative. We must bear in mind that a proposition like ζακ represents an extreme case—i.e., it refers to a subject which might very soon change (as does snow to water). More typical examples of hypothetical necessity "while the subject

¹⁶⁰ See above, p. 77.

¹⁶¹ See, again, Alexander's *in A.Pr.*130.23–4.

holds” would be propositions like ‘Socrates is an animal.’ One can easily see how this might be called necessary, although it too does not hold if one considers all future “Socrateses”: dead Socrates, for instance.¹⁶² And besides, as both Alexander and pseudo-Ammonius argue, if the conclusion is characterized by hypothetical necessity “while the predicate holds,” any syllogism can be said to conclude with a proposition of the requisite sort.

2.6 Conclusion

The results of this investigation are many and detailed, but there are some major ones that I might mention in conclusion. First of all, as we have just seen, the information about *On mixed premisses* that comes to us through Philoponus is largely accurate. He displays a creditable understanding of Theophrastus’s “genuine parts” notion and of the basic issues that must have featured in *On mixed premisses*. Secondly, the information in pseudo-Ammonius about mixed modal syllogisms is not very accurate. I might mention too the piece from Alexander’s refutation of Galen: I have argued that it is a genuine fragment from *On mixed premisses*, providing important information especially about Alexander’s understanding of necessity.

As in chapter 1, we learn here that Alexander was more of a Theophrastan than is commonly acknowledged. He opposes him on the question of how one determines the mode of the minor premiss of ‘NAaB & BaC → ?AaC (preferring an approach which we shall study in chapter 3); but, except for this, his analysis is much indebted to this pupil of the ultimate master. I have also argued that Alexander was quite loyal to his own more immediate master, Sosigenes. He criticized him too, of course; but then, if academic loyalty required slavish reiteration, either there would be no academic loyalty or honest scholarship would never move ahead.

¹⁶² See *An.Pr.*47b29ff.

CHAPTER THREE

LOGICAL MATTER

3.1 *Introduction*

Jonathan Barnes has broken new and fertile ground by raising the issue of the ancient (and particularly Peripatetic) understanding of logical form and logical matter. The notion of logical form and logical matter is not an easy one to characterize, even within—and with the benefit of—modern logic theory, as Barnes shows.¹ But when our intentions become historical and turn toward the ancients, the subject becomes even more muddled: one is not quite sure what one is looking for and, once one has found what seems to be relevant, one is not quite sure how or how completely—or even whether—it can be related to modern notions. Barnes's ultimate judgment with regard to the ancients' understanding (and particularly Alexander's) is that it is "not always coherent." On the other hand, as he says, "the ancients were in this respect no worse off than most moderns."² The purpose of the present chapter is simply to wade into this obscurity, looking for some organizational principles. I shall not succeed in dispelling the obscurity; but I believe I can discern in Alexander's scattered comments on this issue the outlines of a coherent position (albeit a position in many respects quite different from its modern counterparts). Nor am I certain that much more can be got from Alexander.

My primary emphasis will be, as I said, on the characterization of logical matter, since it is here that Alexander makes his most interesting remarks. Logical form will also play a part, but less directly. In connection with logical matter, I shall be interested to an extent in "dummy letters," which have been used by a number of scholars in recent years (in one form or another) to account for Aristotle's understanding of Greek letters as they appear in logical formulae. As in chapter 1, I shall also be interested in relating Alexander's ideas to natural deduction techniques. Finally, applying several of these

¹ Barnes (1990), pp. 16–39; see also Oliver (1967) and Evans (1976).

² Barnes (1990), p. 40, n. 62; also pp. 58–65.

ideas, I shall discuss Alexander's strange notion that matter concludes.

Although its subject matter is probably more difficult, the argumentation of the present chapter is less complicated than in the previous chapters, so I shall dispense here with a more detailed overview than this.

3.2 *What is matter? (initial remarks)*

3.2.1 *The modern conception*

Logical matter is invariably explained in terms of its partner concept, logical form. A.N. Prior explains the pair of notions in this fashion:

The term 'form' . . . is not an easy one to define, but it is easy enough to illustrate. Consider, for example, the argument:

Every equilateral triangle is equiangular

Thus, every equiangular triangle is equilateral

Here both premiss and conclusion happen to be true, but the premiss all the same does not really establish the conclusion. For if it did, we could equally well argue as follows:

Every horned animal is four-footed

Thus, every four-footed animal is horned

These two arguments, though different in their subject-matter, are of the same form. . . .³

The idea is basically this: identifiable in a proposition considered by itself are: (1) an element (or elements) which might vary without changing the logical properties of the proposition, and (2) an element—the form—which remains constant through all such changes of matter. Logic is about the form, not the matter. The forms, are "empty rules" or "matrices" into which might be fitted material taken from the strictly-speaking non-logical world.⁴

³ Prior (1962), pp. 1–2. See also Church (1956), pp. 1–3, 55–6; Mates (1965), pp. 11ff; Corcoran (1974b), p. 102, 105–6, 108.

⁴ I realize that there are many issues raised by this characterization of logical form and matter (on some of which, see Barnes (1990), pp. 16ff); it should be considered no more than a thumbnail sketch.

3.2.2 Alexander's understanding

We find very similar ideas in Alexander, as is to be seen in the following:

The figures are like a sort of common matrix: by fitting matter into them, it is possible to mould the same form in different sorts of matter. For just as things fitted into one and the same matrix differ not in form and figure but in matter, so it is with the syllogistic figures [*in A.Pr.*6.16–21].⁵

We must immediately ask the question, however, What does Alexander mean here by logical matter? And what is the connection between it and logical form? These questions can be answered by first of all attending to *in A.Pr.*26–8—remarks which we looked at above when we considered Alexander's criticism of Theophrastus, as found in Averroes' question 4.

At *in A.Pr.*26.25, Alexander begins a discussion of the three types of Aristotelian proposition: apodeictic, assertoric and problematic. He says that Aristotle does not hold that these various characters are derived "from what underlies and is meant" by the propositions but from the "addition [i.e., the mode] which is annexed or co-predicated."⁶ This is the point we saw him making against Theophrastus, who holds that the mode of the assertoric premiss in (for example) 'NAaB & BaC → ?AaC' is determined by looking to the state-of-affairs to which it refers.⁷ But what are we to make of the suggestion that modal character is derived from the "addition which is annexed or co-predicated"? Are we to understand that the method of logic is to prescind from meanings and attend to the mutual interactions of "pure forms"?

In a sense this is right and in a sense it is not. Shortly after the above passage, at *in A.Pr.*27.27ff, Alexander considers the objection that material considerations (i.e., the fact that "a predicate belongs in this way rather than that"⁸—that is to say, the fact that a predicate belongs assertorically or apodeictically or problematically) have no place in a book devoted to syllogisms and figures. His answer is that they do have a place, for "since propositions which differ in

⁵ See also Alexander's *in A.Pr.*52.19–25, *in Top.* 2.9–15, *Conv.*56, and Barnes (1990), pp. 39–65.

⁶ *in A.Pr.*27.1–5.

⁷ See chapter 2, pp. 95–96.

⁸ *in A.Pr.*27.29–30.

respect of the modes we have mentioned do not convert in the same way, and since most of the syllogisms in the figures other than the first are proved to be deductive by means of conversions, it is indeed necessary for him to divide propositions according to the modes" [*in A.Pr.*28.4–8]. He goes on to mention also the complications involved in mixed modal syllogisms. Thus, the matter which might be fitted into a matrix is (or, at least, can be) pertinent to strictly-speaking logical questions. This should not surprise us since we have already seen that, according to Alexander, the appearance in a syllogism of a semantically-identified "limiting term" such as 'movement' can determine the modal character of its conclusion.⁹ The question of the modal character of at least some conclusions cannot be decided by looking only to the modes explicitly stated in the premisses.

So then, in between the form of a proposition and the world itself, we find matter. Moreover, matter does not hang suspended between the logical and the non-logical: it is definitely part of the logical. Nonetheless, it is obviously the case that logic cannot have *immediately* to do with matter, for its whole point is to show that propositions (and combinations of propositions) involving different matter but similar forms interact in logically predictable ways. Alexander states this just after making the point that material differences have their place in logic:

At any rate,¹⁰ ignoring the material aspect, he annexes the modes themselves to the propositions and produces universal proofs for them; and he thereby shows that the difference among syllogisms does not depend on this or that matter, but rather on the annexed mode. So the proofs, being universal, are a proper object of syllogistic study [*in A.Pr.*28.13–17].

In doing logic we prescind from individual matter (τήνδε τὴν ὕλην ἢ τήνδε—28.15), attending to the attached modes which represent whole classes of meanings. This is not incompatible with the idea that matter has at times a logical role to play. Alexander holds, as we have already seen, that ultimately an assertoric proposition will resolve itself into either a necessary proposition (of one sort or another) or a

⁹ See chapter 2, p. 77.

¹⁰ The sense of the word γοῦν (*in A.Pr.*28.13) is important here. If it is translated "thus" (as at Barnes et al (1991), p. 82), it suggests that the upshot of *in A.Pr.*27.27–28.13 is that matter has no place in logic. But that is not what the passage argues. Better then is 'at any rate.' On Alexander's use of γοῦν, see note 147, chapter 2.

contingent proposition. Once this resolution takes place, the two classes of propositions can be gathered under a universal ("the annexed mode") by means of which logical relations can be analysed.¹¹ In fact, even before this resolution takes place, propositions of various material types can be classed as either apodeictic, assertoric or problematic, although the assertorics (as we have seen) sometimes present problems which can only be solved by attending to the matter represented as assertoric.

The present reading of *in A.Pr.*26–8 is not uncontroversial. An alternative reading would be to understand Alexander to be speaking throughout this section about the need to recognize that Aristotle employs in the syllogistic not propositions which, for example, say that *p* where in fact it is necessary that *p* but propositions which actually have the form 'necessarily *p*.'¹² But this seems unlikely for three reasons. First, as we saw in chapter 2, Alexander agrees with Theophrastus that in the modal syllogistic premisses sometimes do not "wear their mode upon their sleeve." Secondly, this alternative reading (as far as I can see) does not account for Alexander's positive defence of the idea that matter has a role to play in logic (i.e., *in A.Pr.*28.2–13). Third, according to this reading it is necessary to posit a later incorporation into the text in order to account for the apparent fact that Alexander repeats himself.¹³ It is much easier, it seems to me, to read *in A.Pr.*26–8 as containing two separate arguments. The first (which never mentions matter) makes the point that a premiss's mode is not determined by facts in the world; the second that logical matter is part of logic. Appended to this latter argument is the required rider that (obviously) logic has not *immediately* to do with matter: in order to establish logical relationships among propositions we prescind from matter and attend to form. But this is not a banishment of matter from logic. It is a typically discriminating Alexandrian position: although matter is part of logic, the point of the latter is to ignore it.

In identifying the idea in Alexander that a syllogism's form is inseparable from its matter, we are standing again before his rejection of the Theophrastan idea that "an assertoric proposition . . . is a

¹¹ Note that at *in A.Pr.*27.4, Alexander speaks of only two modes: the apodeictic and the problematic. Wallies' addition of ἡ ὑπάρχει is untenable.

¹² This understanding is put forward in Barnes et al (1991), pp. 80–82. See especially nn. 160 and 165.

¹³ See Barnes et al (1991), p. 81, n. 165.

proposition that does not possess a modality [of possibility or necessity].”¹⁴ There Alexander’s point was that an assertoric proposition contains matter. It is not a place-holder waiting to be assigned the mode “necessarily” or “possibly”: its mode can be determined by looking to its matter.¹⁵ Here the point is (in a way) more general: all syllogisms, even insofar as they are logical, contain matter. The Greek behind what is translated above, “ignoring the material aspect,” is *χωρίς . . . τῆς ὕλης* [*in A.Pr.*28.13]. This suggests the standard Aristotelian relationship between form and matter: that they are separable in mind but not in fact.¹⁶ According to Alexander, then, we can *think* of a proposition independently of its matter—i.e., abstracting from the particular meanings which might be brought together in the common logical form—, but there is no such thing, even in logic, as a proposition without its proper matter.

As we proceed, I shall be refining this conception of the inseparability of logical form and matter.

3.2.3 *Dummy letters (modern)*

A number of recent commentators have discerned just such a close relationship between the general and the particular also in Aristotle’s logical theory. In an appendix I discuss Ferejohn’s “referential” universals and particulars.¹⁷ Somewhat more to the point is the idea that the letters Aristotle uses in the *Prior Analytics* are “dummy letters” rather than variables.

Łukasiewicz, with characteristic verve, had said that “[t]he introduction of variables into logic is one of Aristotle’s greatest inventions”; and he gives credit to Alexander for first having appreciated the importance of the invention: “It was Alexander who first said explicitly that Aristotle presents his doctrine in letters, *στοιχεῖα*, in order to show that we get the conclusion not in consequence of the matter of the premisses, but in consequence of their form and combination.”¹⁸ In recent years, however, understanding of the nature of

¹⁴ See p. 95.

¹⁵ In what sense we look to the matter, however, will be discussed below.

¹⁶ See, for instance, *Phys.*193b4–5, 31–194a7, *Metaph.*1026a15, 1029a27–8, *DA*413a3–5. Alexander makes the point at *in A.Pr.*4.9–12.

¹⁷ See Appendix (Logical Symbols and Conventions). Very much pertinent also to the present issue is Theron’s criticism of Geach’s ideas on subject-predicate. See especially Theron (1986), p. 388.

¹⁸ Łukasiewicz (1957), pp. 7–8. In connection with this last remark, Łukasiewicz

Aristotle's invention has become more precise. Lee rejects to a certain extent Łukasiewicz's characterization: "Certainly, Alexander understood the letters A, B and C not as variables but rather as abbreviated examples."¹⁹ Barnes, in turn, sees the incoherence in this latter conception: "The letters are not variables; but neither are they shortened versions of actual names (otherwise we could sensibly ask, of [a sentence such as 'A is equal to B'], 'To which putatively equal objects are you here referring?')."²⁰ He points rather to the notion of "dummy letters," as found in Frede and (more expansively) Corcoran and Kirwan.²¹

Kirwan, for instance, defines dummy letters in contradistinction to "schematic letters." A dummy letter can itself be assigned a meaning; a schematic letter, on the other hand, might be assigned a word or expression, which in turn, might be given a meaning.²² Thus, a dummy letter can be regarded as a meaning (although one that is not yet specified), whereas a schematic letter is more like a gap waiting to be filled. Variables, under the standard interpretation, also represent gaps:²³ when they are "free," they can be filled in with any syntactically appropriate word (or schematic letter, for that matter); when they are "bound," the possibilities are limited by the binding, which establishes "indexical links" within and among formulae.²⁴

cites in *A.Pr.*53.28–54.2. Bochenski follows Łukasiewicz in this: Bochenski (1956), 24.07, 24.08 (see Lee (1984), p. 18).

¹⁹ Lee (1984), p. 109; cp. also p. 40.

²⁰ Barnes (1990), p. 68, n. 139. Barnes also rightly queries what Lee can possibly mean by "abbreviated examples" (*abgekürzte Beispiele*), suggesting that if anything it must mean "abbreviated names."

²¹ Frede (1974b), p. 113; Corcoran (1974b), pp. 94–5, 100 (including n. 10); Corcoran (1974a), p. 279; Kirwan (1978), pp. 1–8. See also Barnes (1990), p. 20 and Barnes et al (1991), p. 116, n. 71. Modern credit for having identified the Aristotelian conception of variables should probably, however, go to Mignucci. See below, note 24.

²² Kirwan (1978), pp. 7–8. Kirwan illustrates the difference by means of schematic/dummy letters pertaining to "sentences." Consider the two formulae (E) 'John is tall and John is handsome; so John is tall' and (Es) 'p and q; so p.' If we interpret the italicized letters in (Es) as dummy letters, "(Es) would simply restate (E) in partly symbolic language; or we can take them as schematic letters, so that (Es) gives the pattern of (E)" [Kirwan (1978), p. 33].

²³ Some authors, notes Kirwan, confusingly apply the word 'variable' to schematic letters [Kirwan (1976), p. 6].

²⁴ Quine (1952), pp. 83–94; Kirwan (1978), p. 6. See also Mignucci (1965a), pp. 156–158, who also argues that the syllogistic "variabli" should not be understood as gaps, capable of being filled by whatever content is allowed for by the logical system, but as "determinate universals" (*universali determinati*). By the latter he means basically what Ferejohn means when he speaks of "referential universals" [see, again,

That Alexander too had such an understanding—i.e., that he conceived of the meanings of propositions (or their matter) as an essential logical part of the propositions, although capable of being prescinded from—we have already seen. But it will be interesting to look at a pair of passages in which he discusses this—and in which the “discriminating” character of his approach is again in evidence.

In both passages he is discussing Aristotle’s use of letters. In the first, in *A.Pr.*53.28–54.2, he says that Aristotle:

uses letters in his exposition in order to indicate to us that the conclusions do not depend on the matter but on the figure, on the conjunction of the premisses and on the modes. For so-and-so is deduced syllogistically not because the matter is of such-and-such a kind but because the combination is so-and-so. The letters, then, show that the conclusion will be such-and-such universally, always and for every assumption.²⁵

In the second, in discussing the use of letters in proofs (and, in particular, as a comment on the words ὥστε οὐδὲ γίνεται συλλογισμός—*An.Pr.*49b39–50a1), he remarks that:

[Aristotle] has made it clear²⁶ that proofs using such letters are sketches (ὑπογραφαί) of the syllogistic modes: they are not however syllogisms. For a syllogism has matter, with respect to which something is proved [*in A.Pr.*380.24–7].²⁷

The two obstacles between which Alexander obviously wishes to steer are the idea that Aristotelian syllogisms are “empty rules” and that they are so “full” as to forfeit generality.

3.2.4 *Dummy letters (ancient)*

It is interesting to note that in the ancient world after Alexander we find the variable/dummy-letter split among interpreters of Aristotle. Ammonius thought of the syllogistic as composed of ψιλοὶ κανόνες

Appendix (Logical Symbols and Conventions)]. Aristotle, Mignucci notes, “gives a precise definition of the terms of the syllogism, while a ‘gap’ by its very nature is not definable, except precisely as a gap” (p. 158).

²⁵ For cross-references see Barnes et al (1991), p. 116, n. 71.

²⁶ I.e., by ὥστε οὐδὲ γίνεται συλλογισμός [*An.Pr.*49b39–50a1]. There should perhaps be a new lemma here (i.e., at *in A.Pr.*380.24), as suggested in the apparatus.

²⁷ For a parallel passage, see *in Top.* 10.19–28; see also Lee (1984), p. 48.

ἄνευ τῶν πραγμάτων: “empty rules, without subject matter,”²⁸ by which he meant that these empty rules were quite divorced also from the variable meanings they might be used upon. He argues that if logic is considered as a part of philosophy then its formulae will contain actual words like ‘soul’ and ‘immortal’; if, on the other hand, it is considered as an “organon,” they will contain only letters (these then giving us empty rules).²⁹ Philoponus, on the other hand, prefers to speak of καθολικοὶ κανόνες: general rules,³⁰ which he regards as a substitute for the impossible task of going through all the matter to which a propositional form might refer.³¹ Specifying particular matter, however, is always possible: it is a question of personal preference or convenience. He says that Aristotle gives letters, so that someone can “at will practise with any matter the things said.”³² He makes indeed the distinction ‘organon/part’ found in Ammonius; but, significantly, when depicting logic as organon, he does not use letters but speaks rather of how a logician might talk (in the meta-language, we would say) of ‘universal affirmatives,’ ‘the conclusion,’ etc. Logic as part would involve words like ‘man,’ ‘animal,’ and ‘ensouled.’³³

Matter, then, for Philoponus, is tied much more closely to the abstracted form than it is in Ammonius. But if this is true, Lee is wrong to criticize him for employing the expression, ‘general rule.’³⁴ ‘General rule’ is much closer to what Aristotle had in mind than the empty rules that Ammonius conceives of.

²⁸ Ammonius, in *A.Pr.*11.3.

²⁹ He insists on a separation between logic and meanings at in *Int.*113 (see especially 113.13–15), although the argument itself is certainly one that Alexander would agree with. The expression ‘empty rules’ appears also in Plotinus, *enn.*I iii 5, where Plotinus says that dialectic is not an organon of philosophy—which would be to be concerned with empty theorems and rules [ψιλὰ θεωρήματά ἐστι καὶ κανόνες]—but is concerned with actual things and has as its matter beings [περὶ πράγματά ἐστι καὶ οἷον ὕλην ἔχει τὰ ὄντα]. Alexander would not like the alternatives on offer here: either emptiness or things themselves.

³⁰ Philoponus, in *A.Pr.*47.3.

³¹ Philoponus, in *A.Pr.*47.1–3. Compare Corcoran (1974b), p. 108: “A Form is simply a set of formally similar arguments.”

³² Philoponus, in *A.Pr.*75.10–15. (The “things said” are the things Aristotle says about syllogistic moods of the first figure.) At in *A.Pr.*46.31, Philoponus says that in using letters Aristotle is able to proceed more generally and “hollowly” (i.e., without matter): καθολικῶς τε καὶ ἀόλως. But the context makes it clear that here too this hollowness is to be filled with matter at the will of “who wishes.”

³³ Philoponus, in *A.Pr.*9.5ff. See Lee (1984), p. 42.

³⁴ Lee (1984), p. 42.

3.2.5 *Matter as “stuff”?*

So then, Alexander’s scheme involves what appear to be three distinct “layers”: the world itself (that which “underlies and is meant” by propositions), matter and form. Form corresponds to the various figures, which certain instances of matter have in common and which can therefore be abstracted from them.³⁵ It includes the attached modes (which are not to be excluded from logic), but not the corresponding differences of matter. Nonetheless, logic itself is about “concrete” (material) propositions. That is, it is logic’s task to examine arguments put forth in one forum or another—some of them valid, some of them fallacious—in order to determine which can be gathered under the universally valid forms (“fitted into the matrices”) known as the syllogistic figures.

Do we then identify differences of matter simply by examining the terms used in a proposition (or perhaps that to which they refer) in order to discover whether we are dealing with necessary or contingent “stuff”?³⁶ There are passages in Alexander which would suggest this. In discussing Aristotle’s *De caelo*, for instance, Alexander seems to assume that an assertoric proposition is essentially different from an apodeictic in that it is composed of terms referring to contingent matter, whereas the apodeictic contains terms referring to necessary matter.³⁷ We might recall too the discussion of types of necessity in the previous chapter: the proposition ‘the sun in in motion,’ for example, served throughout as a paradigmatic instance of an apodeictic proposition. It would seem therefore that determining types of proposition is simply a matter of taking a look at the terms. Things, however, are not so easy.

Let us look again briefly at *in A.Pr.*27.1ff. We see there that for Alexander the introduction of matter into the syllogistic is an issue because “[d]ifferences of this sort among propositions will seem to bear not on an argument’s being a syllogism *simpliciter* but on its being this or that kind of syllogism—demonstrative, say, or dialectical.”³⁸ He rejects the notion that the introduction of matter affects the enterprise’s status as logical (i.e., “an argument’s being a syllo-

³⁵ See *in A.Pr.*6.16–21.

³⁶ In what follows, I shall use the term ‘stuff’ as shorthand for the understanding of matter presented in the present paragraph. The most succinct statement of this “stuff” approach to logical matter is found at Ammonius, *in Int.*215.7–28.

³⁷ See Simplicius, *in Cael.*344.14–17.

³⁸ *in A.Pr.*27.30–28.2.

gism *simpliciter*”), but by no means does he do this by rejecting the notion that matter has a connection with whether a syllogism is demonstrative or dialectical. Indeed, he appears to want to combine this notion with (what we would regard as) the standard notion of logical form and matter: that of stuff which is matched to a matrix.

This becomes quite clear at the beginning of Alexander’s commentary on the *Topics*, where he discusses the Aristotelian sense of the word ‘dialectic.’ Dialectic, he says, is a *type* of syllogistic method for, although syllogisms insofar as they are syllogisms do not differ one from another, they do differ in three other respects: (i) according to the sort of proposition they might contain—e.i., categorical or hypothetical; (ii) according to figure and mood, and (iii) “according to the matter about which they are concerned.”³⁹

The first of these respects does not concern us; both the second and third, however, do. For both of them involve matter—although in different senses. Respect (ii), says Alexander, concerns the division of syllogisms into perfect and imperfect and into the first, second and third figures:

For [says Alexander] the syllogisms—the one which states that ‘every man is risible, no risible thing is a horse’; the one which states that ‘every man is risible, no horse is risible’; finally, the one which states that ‘every risible thing is a man, no risible thing is a horse’—having the same matter are not the same as each other, on account of the different way in which the propositions are assumed and positioned [*in Top.* 2.9–14].

Alexander is employing here matter in the sense of stuff which might find its way into different matrices: in each of these syllogisms, the stuff (man, risible, horse) is the same; only the figure is different.

Then Alexander turns to the third respect in which syllogisms might differ: i.e., *κατὰ τὴν ὕλην*.⁴⁰ It is this respect, he says, which gives us apodeictic, dialectical and eristic syllogisms.

For, just as skills which insofar as they are skills do not differ from each other,⁴¹ do assume a difference according to the difference of

³⁹ *in Top.* 2.3–5.

⁴⁰ *in Top.* 2.5, 15.

⁴¹ This idea is obviously meant to parallel that found at *in Top.* 2.2–3: that syllogisms, insofar as they are syllogisms, do not differ from each other (although they do differ in the three ways mentioned above, which include “according to the matter about which they are concerned”).

matter they deal with—i.e., the mode of operation⁴²—with the result that of these [i.e., the skills] there is carpentry and architecture and certain other skills, so it is with syllogisms [*in Top.* 2.16–20].

Alexander explains himself again by means of examples. The first example (I) is demonstrative (since, as he says, its minor premiss can be proven from the definition of pleasure);⁴³ the second (II) is not demonstrative (since its minor premiss is false),⁴⁴ although it is a syllogism nonetheless:

- (I) 'imperfect' [e] 'good'
 'perfect' [a] 'pleasure'
 —————
 'good' [e] 'pleasure'⁴⁵
- (II) 'good-producing' [e] 'pleasure'
 'good-producing' [a] 'good'
 —————
 'pleasure' [e] 'good'

If we attend to the structure of the larger argument, it is fairly easy to see what Alexander is getting at here. In order to bring into relief differences among syllogisms with respect to figure (i.e., (ii)), Alexander holds constant the matter (in the sense of stuff) and varies the figure. Now, in order to bring into relief the way in which syllogisms might differ κατὰ τὴν ὕλην (i.e., (iii)), he holds constant not only the stuff but also the figure. Both (I) and (II) deal in pleasures and goods, etc., and they are both in the second figure⁴⁶—which is all the more striking since technically an apodeictic syllogism should be in the first figure.⁴⁷ Since therefore (I) and (II) are identical in both stuff and figure, respect (iii) must consist in something besides these two. What this is Alexander indicates in the above quotation: they differ with respect to the matter they deal with—that is, the mode of operation.

⁴² παρὰ τὴν τῆς ὕλης περὶ ἣν εἰσι διαφορὰν καὶ τὸν τῆς χρήσεως τρόπον τὴν διαφορὰν λαμβάνουσιν—2.17–18. I translate the καὶ epexegetically.

⁴³ *in Top.* 3.1–3.

⁴⁴ As Alexander says at *in Top.* 3.4.

⁴⁵ Alexander actually leaves off the conclusions: *in Top.* 2.27–28. The method of representation here is fairly obvious: [e] is to be read as 'holds of no,' [a] as 'holds of every.'

⁴⁶ Alexander actually calls attention to this: κατὰ γὰρ τὸ εἶδος οὐδὲν ἀλλήλων διαφέροντες οἱ συλλογισμοί—*in Top.* 2.26–7.

⁴⁷ *An.Post.* 79a17–18.

This difference of matter must have to do not with stuff but with how it is used.

It is not insignificant that Alexander explains the notion of differing "according to the difference of matter they deal with—i.e., the mode of operation" by means of the examples "carpentry and architecture and certain other skills." For these two skills (and also presumably the others skills) might be conceived of as dealing with roughly the same stuff in a different manner. One can walk onto a building site and see a carpenter and an architect positioning a piece of wood. In one sense, they are dealing with the same type of matter: wood. In another sense, that matter constitutes something different for each of them. The one will think of it as simply another plank he must put in place; the other will understand it perhaps as a necessary component of an aesthetic effect he hopes to achieve. What that act of placing the wood is—i.e., whether the wood is placed there *as* something that must be precisely *there*—depends on the "mode of operation."

It must, of course, be admitted: we might also think of a carpenter and an architect operating with different stuff. The architect typically works with plans, geometrical figures, and the like; usually only the carpenter works with wood and the other building materials. Perhaps then we must conceive of the common stuff with which they work as "houses." But it is probably best not to seek too much precision within the analogy, since Alexander doesn't not seek it either. The one important thing seems fairly clear: according to Alexander, although a carpenter and an architect might work with the same sort of stuff, nonetheless there is a material difference in the object of their respective skills.

Applying the analogy to syllogisms, the idea would be that syllogisms might be put together from the same general stock of terms and yet differ according to the type of practice the syllogism is part of: whether a scientific demonstration or a dialectical exercise. Or, to make it more obvious that this is a difference in *subject* matter: respect (iii) will depend upon whether or not the person constructing the syllogism works with propositions that are "true and proper to the task and prior and more familiar" [*in Top.* 2.20–21].⁴⁸ If he works

⁴⁸ It is clear therefore that when Alexander says such things (as also at *in A.Pr.* 12.23–4 where he says that demonstrative propositions differ from other propositions among other things "with regard to their matter—for they are true and prior and known

rather with reputable opinions which may or may not be true, he is not a scientist but a dialectician.⁴⁹ Thus, we can speak of the matter of a syllogism in two senses: with an eye either to the stuff found in its terms or to the larger body of knowledge of which it is a part. Logical matter will therefore also involve the fact that a syllogism is fitted into either a scientific or a dialectical context.

It is important to point out also that, although the differences between (I) and (II) (above) are brought out by allowing (II) to contain a false proposition (such as could only find its way into a dialectical syllogism), according to Alexander there is nothing preventing a dialectical syllogism from containing only true premisses. He says in his commentary on the *Metaphysics* that philosophy and the dialectic differ only according to “manner of potentiality” (τῷ τρόπῳ τῆς δυνάμεως—260.2).⁵⁰ That is:

Both concern being and the things that hold of it and both are syllogistic, but for the one this syllogistic potentiality is demonstrative of truths; dialectic, on the other hand, is investigative with regard to truths and syllogistic with regard to reputable opinion.⁵¹ Thus, the dialectician takes up both <sides of a question>; and with respect to those things with which the philosopher is probative and knowledgeable, the dialectician is [merely] investigative—that is, making trial of those who pretend to know these things,⁵² who do not however know them—which experiment, being conducted by means of the predicates of these things according to the various sciences (which even those who do not have scientific knowledge of them are capable of knowing), does not therefore demonstrate that one engaging in such an experiment is knowledgeable [in *Metaph.* 260.2–11].⁵³

and necessary” [see *An.Post.* 71b20–72a24, *An.Pr.* 24a30–b1]), we should spotlight not just the words ‘necessary’ and ‘true’ but also ‘prior’ and ‘known.’ Alexander devotes a substantial section of his commentary on the *Topics* to an explanation of how, not just syllogisms employing first principles (and therefore prior), but also every syllogism falling under these (and therefore part of the same system of knowledge) can be called apodeictic: in *Top.* 16.29–18.9. We shall examine part of this section below. His view is based on *Top.* 100a27–29.

⁴⁹ The method in either case takes its name from the practitioner—or practitioners—, not vice-versa [in *Top.* 3.4–24].

⁵⁰ There is an echo here perhaps of the τὸν τῆς χρήσεως τρόπον of in *Top.* 2.18.

⁵¹ πειραστική περὶ τῶν ἀληθῶν καὶ τοῦ ἐνδόξου συλλογιστική—260.5. Note that the class of ἐνδόξα does not contain all the truths—some are ἀδοξα: see in *Top.* 22.4–6 (cp. in *Top.* 15.23).

⁵² πείραν λαμβάνων τῶν προσποιουμένων αὐτὰ εἶδέναι—260.8.

⁵³ Compare this passage to *SE* 165b3–7 and 171b4–6.

Here again we encounter the idea that the stuff of dialectic is the same stuff a philosopher works with (that is, they use the same general stock of predicates). Moreover, the dialectician deals also in truths (although not entirely in truths). The crucial thing, as far as Alexander is concerned, is the background structure into which a truth (or a falsehood) is fitted.

3.3 *Some relevant texts*

So then, I have claimed that for Alexander matter is not determined by the way things stand in the world but rather takes up a middle position between things and form, and a position more closely related to form than to things. I have argued also that matter should not be considered merely stuff (in the special sense isolated) but is tied up also with the body of knowledge within which a proposition appears. I would like now to examine a number of passages in Alexander which will allow me to further substantiate the above claims and to develop them. Then (after a few remarks on natural deduction) I shall move on to the issue of how matter can be said to conclude.

3.3.1 in *Top.*21

Alexander says at in *Top.* 21.5–13 that there is a type of eristic syllogism which is genuinely a syllogism but eristic insofar as its matter is faulty. The example he gives is: “everything pertaining to males has courage; the cloak is a man’s cloak; therefore, the cloak has courage.”⁵⁴ The mistake here, he says, is the false assumption that “everything pertaining to males has courage.” This is an error of matter, since the major premiss is false; the form, however, is perfectly in order: we have here, says Alexander, a syllogism of the first figure with universal affirmative major and particular affirmative minor.⁵⁵

On the other hand, as he says at in *Top.* 21.13–31, sometimes we have an eristic “syllogism” which errs with respect to form. Such are

⁵⁴ The argument is slightly more plausible in Greek, where ἀνδρεία (courage) and ἀνδρεῖος (manly) are cognates and ἀνδρεῖος has the sense ‘pertaining to males’ as well.

⁵⁵ in *Top.* 21.11–13. The minor is actually a singular proposition, not a particular.

not really syllogisms at all, since to err with respect to form is to fail to come under one of the syllogistic moods. For example, someone might try to argue, from the premisses ‘animal holds of every man’ and ‘animal holds of every horse,’ that every man is a horse. “This combination is non-syllogistic,” he says, “even though it is made up of true premisses, since there are two affirmatives in the second figure” [*in Top.* 21.17–19].⁵⁶

Now the interesting thing about this passage is that one expects here more symmetry than in fact transpires. That is, one would expect Alexander to say that the first example represents good form and faulty matter and the second faulty form and good matter. But Alexander never mentions matter with regard to the second. Although the first involves error with respect to matter, it is said of the second that it is “by no means a syllogism *simpliciter* but entirely an eristic ‘syllogism.’”⁵⁷ The first is in order formally, eristic only in matter; the second is wholly eristic. It is as if an absence of form vitiated also the matter—even if, in another sense, the matter is perfectly in order (i.e., in the sense that, if it were contained in proper form, we would have good form and good matter).

My point then is not that these non-syllogistic combinations do not involve matter in any sense. As we shall see below, Alexander holds that non-syllogistic combinations are such precisely because they give a different conclusion depending on the matter. My point rather is that form (or, in this instance, lack of form) affects the matter it might contain. Determining the matter contained in an argument is not just a question of attending to the stuff it is about. If the form which is meant to contain the matter is inadequate, this affects the matter.

We might therefore speak of “syllogistic matter”—matter which is contained in proper syllogistic form. It may be *incorrect* matter (i.e., the premisses may be false) but this does not prevent such a combination from being a genuine union of logical form and logical matter—i.e., it does not prevent it from being a syllogism. On the other

⁵⁶ See Barnes (1990), p. 57, n. 111, where he says that among the ancients (and those just after them) the distinction between formal and material fallacies “amounts in effect to the distinction between invalid arguments and valid arguments with false premisses.”

⁵⁷ οὗτος δὲ οὐκέτι οὐδὲ συλλογισμὸς ἀπλῶς ἐστίν, ἀλλὰ τὸ ὅλον τοῦτο ἐριστικὸς συλλογισμὸς—21.14–15. The remark is difficult to translate literally, although the sense is clear: just as a bogus bank note is not a bank note, so an eristic syllogism is not a syllogism. Cf. *in A.Pr.* 12.12.

hand, a non-syllogistic combination does not come up to the level of containing appropriate (syllogistic) matter—even if it contains true premisses, for syllogistic matter is correlative with syllogistic form.

3.3.2 in *Top.10*

This finding is corroborated by another passage, in the vicinity of the former, where Alexander discusses “what the Stoics called”⁵⁸ duplicating and non-differently concluding syllogisms, which are not, as they stand,⁵⁹ in proper syllogistic form (although they do have some “form”—or, as Alexander prefers here, “shape”). These are arguments like the following:

If it is day, it is day
But it is day
Therefore, it is day

Either it is day or it is light
But it is day
Therefore, it is day⁶⁰

Alexander’s general point in this section concerns the utility of such arguments: they fail, he objects, to derive “something other than the suppositions”⁶¹ and therefore are not properly called syllogisms:⁶²

For the shape [τὸ σχῆμα] of an expression is not sufficient to make it a syllogism; but it is necessary in the first instance for that which is signified by the expression to be capable of proving something. For with no other tools is the shape [τὸ σχῆμα] sufficient to manifest the nature of the tool; but it must have its proper material [ὑλῆς], together with which it accomplishes its proper task. At any rate, there is required for a saw a certain quality of material, for no one would call a saw something in that shape but made of wax [*in Top. 10.19–24*].⁶³

⁵⁸ *in Top. 10.7–8*. See *in A.Pr.18.17, 20.11*.

⁵⁹ *in A.Pr.18.18–20*.

⁶⁰ I shall refer to arguments of these two sorts as “the Stoic arguments.”

⁶¹ *in Top. 9.20*; also *An.Pr.24b19*. The suppositions (κείμενα) are, of course, the premisses.

⁶² *in Top. 10.13–19*. See also *in A.Pr.18.8ff* and Barnes et al (1991), pp. 66–71, especially the notes.

⁶³ That Alexander uses in this context the concept of matter cannot be coincidental. At *Phys.200a10–15*, while discussing necessity (including, presumably, syllogistic necessity), Aristotle uses the same notion of a saw requiring proper material. (See just before this: *Phys.195a18–19* and *Phys.B,2–3* generally.) Alexander’s

In one sense of matter, the Stoic arguments are perfectly in order: the propositions are true (or at least they could be true). Alexander even suggests that their *form* might be all right: “the shape of an expression is not *sufficient* to make it a syllogism.” (We shall see below however that, insofar as such arguments contain fewer than the requisite three distinct terms, they might be faulted for their form as well.) In another sense of matter, however—i.e., the sense with which Alexander is concerned here—, the Stoic arguments are deficient. Matter in this sense is not just a question of stuff. It has to do with whether, by means of an argument, our knowledge is increased: whether we can conclude “something other than the suppositions.”⁶⁴ It has to do, that is, with what *work* an argument can do. According to Alexander, a syllogism containing propositions which are “true and prior and known and necessary” does a great deal of work. By contrast, as we might put it, the Stoic arguments are flabby.

We can discern, I think, a certain convergence between these ideas and the ideas contained in the opening pages of *in Top.* There it is clear that Alexander sees different types of matter in a syllogism, depending on whether it is part of a dialectical exercise or a scientific proof. Having in mind now the image of a saw, we might say that “scientific matter” is matter which is most appropriate for a saw: the finest steel. Just below would be steel of lesser quality: “dialectical matter.” Below both of these would be inappropriate matter of whatever sort: that which is contained in the Stoic arguments or in eristic “syllogisms” which err with respect to form. Through all of this we must understand, however, that matter is not stuff. What is weak matter in one context might be strong in another.

3.3.3 in *Metaph.* 148

Another relevant text is found in Alexander’s commentary on the *Metaphysics*. There we find a very direct consideration of what, up until now, we have perhaps only sensed happening. That is, when

understanding of *how* the matter of a syllogism bears on its concluding is a complex one: we shall examine this below. We might take note at this point however of the hesitation which Alexander registers when he says (first) that a saw requires its proper material—then adds, “at any rate, there is required . . . a certain quality of material.” As we shall see, Alexander thinks that a syllogism must have its proper matter but that this may vary in degrees of “tensile strength.”

⁶⁴ See note 61.

Alexander begins to introduce into his understanding of logical matter the question of what larger system a proposition belongs to, we have the sensation that things belonging properly to the context within which a proposition might be put forward are gravitating toward (and characterizing) the subject matter itself. At *in Metaph.* 148 he addresses this issue straight on.

In one passage however in *in Top.*, Alexander seems concerned to deny that this migration is even occurring. In the passage I have in mind, he has been discussing the characterizing differences among types of syllogism. The apodeictic syllogism, says Alexander, is distinctive insofar as it arises from things prior and true; the dialectical insofar as it arises from reputable opinions.⁶⁵ He spends quite some time explaining what “prior and true” might mean (*in Top.* 16.25–18.3), after which he proceeds to discuss the various ways in which a proposition might be a reputable opinion. That discussion ends with the following lines:

Reputable opinion differs from the true not by being false [διαφέρει δὲ τὸ ἔνδοξον τοῦ ἀληθοῦς οὐ τῷ ψευδὲς εἶναι] (for there are also true reputable opinions) but with respect to <its> determination [τῇ ἐπικρίσει]. For with respect to truth, the determination derives from the object [πράγμα] it is about, for when this agrees with it then it is true.⁶⁶ With respect however to being a reputable opinion, the determination derives not from the things [πράγματα] but from the audience and the preconceptions they have concerning these things [*in Top.* 19.22–27].

Alexander clearly distinguishes in these remarks between the object of an opinion and the context within which it is offered. And yet even here there are hints of something else at play. The reputable opinion’s “determination” comes from both the object [πράγμα] and the context. This determination must have to do with the way in which the various types of syllogism differ from one another—and this, as we have seen, pertains to logical matter. Secondly, the initial suggestion that “reputable opinion differs from the true” carries with it the idea that there is a way of being true which is more exalted than being true merely as a reputable opinion. If my comments above are on the mark, this additional “determination” of the true—additional insofar as it is added to mere correspondence to the facts—

⁶⁵ *in Top.* 15.22ff. See also *Top.* 100a27–30.

⁶⁶ ὅταν γὰρ τοῦτο αὐτῷ ὁμολογῇ, τότε ἐστὶν ἀληθές—in *Top.* 19.24–5. In other words, when the *πράγμα* agrees with the reputable opinion, then it is true.

has to do with the larger system of knowledge within which a proposition appears. Context has an influence, therefore, on truth itself.

All these considerations come out into the open however, as I have said, at *in Metaph.*148. The immediate occasion for Alexander's comments is Aristotle's suggestion in *Metaph.*2,1 that there are "degrees of truth." Alexander comments:

There is nothing paradoxical in saying that 'true' differs from 'true' [οὐδὲν δὲ ἄτοπον λέγειν ἀληθὲς ἀληθοῦς διαφέρειν—148.10–11], if indeed it is the case that 'true' is connected with being and being differs according to the things known. For some things known are scientific knowledge, others opinions. For as <Aristotle> will say in what follows, it is necessary for there to be matter of things that are in motion.⁶⁷ For not every being is known scientifically, but every being is true. But for each thing, knowledge of the being as it stands is truth, not <as things are> by virtue of themselves⁶⁸ (for truth is not in the things)⁶⁹ but by virtue of the extent to which knowledge of the being as it stands is truth. But if this is so, then knowledge of being as it stands in the highest degree is truth in the highest degree—if in fact it is scientific knowledge. So, since truth follows upon being, truth in the highest degree follows upon being in the highest degree [*in Metaph.*148.10–19].

The resemblance between this passage and the former is unmistakable. Alexander is addressing the same issue we saw above, different ways of being 'true'; but, instead of addressing the question wherein lies the distinctiveness of reputable opinion, here he confronts the issue of the way in which this distinctiveness affects (according to Aristotle) the very object of a particular enterprise. Everything in the

⁶⁷ This difficult remark looks forward to the also very difficult (and probably corrupt) text at *Metaph.*994b25: 'Ἀλλὰ καὶ τὴν ὕλην κινουμένην νοεῖν ἀνάγκη (as it appears in the lemma in Alexander). Alexander acknowledges variant readings of the text and offers in exegesis some ideas about matter's being properly the object not of scientific knowledge but of opinion [*in Metaph.*164.19–20] (which would seem to exclude matter from scientific knowledge—although this presumably would not apply to logical matter). Alexander's point in the present passage (i.e., at *in Metaph.*148.12–13) seems to be this: 'There are two objects of knowledge: things known which are scientific and things known which are reputable opinion. Aristotle acknowledges the latter with his remark about matter belonging to that which is in motion.' On all this, see Dooley and Madigan (1992), p. 24, n. 46 and p. 52, n. 142.

⁶⁸ Understanding καθ' αὐτά: see Dooley and Madigan (1992), p. 25, n. 48. The shift to the plural is strange, but we find the same thing at *in Top.* 19.25.

⁶⁹ οὐ γὰρ ἐν τοῖς πράγμασιν ἡ ἀλήθεια—148.15; compare *in Top.* 19.23–4, which appears to say the opposite (!): ἔστι γὰρ τῷ μὲν ἀληθεῖ ἀπὸ τοῦ πράγματος, περὶ οὗ ἐστίν, ἡ ἐπίκρισις. But Alexander, in the latter, does not say that truth is *in* the thing.

passage turns on how *being* stands; and being is said to differ “according to the things known.”⁷⁰ A dialectical syllogism, for instance, possesses truth in a manner specific to its object; but this object is not simply the *πρᾶγμα* to which it corresponds: it involves also “how it stands.”⁷¹

Alexander has in this passage, of course, a good hold on the distinction between how a thing is “as it stands” and the thing as it is by virtue of itself (what we might call the simple fact). On the other hand, his thing “as it stands” clearly corresponds to what we would now identify as the syllogism’s matter—i.e., the syllogism insofar as it is part either of a scientific or of a dialectical enterprise. So again, “how a thing stands” may indeed *derive* from the type of knowledge it is (i.e., whether scientific or dialectical); but it also characterizes the object—or, we might say, the substrate—of knowledge: “being differs according to the things known.”

3.3.4 in *A.Pr.*13–14

One final relevant text is in *A.Pr.*13.30–14.5, where Alexander is commenting upon Aristotle’s statements (at *An.Pr.*24a30–b11) that a syllogistic proposition is:

demonstrative if it is true and is assumed by way of the initial hypotheses. It is dialectical if it is a request for one of a contradictory pair (if you are inquiring) or an assumption of what is apparent and reputable (if you are syllogizing)—as has been said in the *Topics*.

Alexander’s comments (in very literal translation) are as follows:

He also makes a division among dialectical propositions: for one sort is the dialectical proposition of someone inquiring and requesting (‘a

⁷⁰ Dooley suggests that the Greek behind “for each thing, truth is knowledge of the being as it stands” might be translated (and paraphrased) as follows: “‘knowledge of how a thing stands in respect to being in each particular instance’ . . . , whether sc. it is substance or accident, eternal or mutable substance” [Dooley and Madigan (1992), p. 25, n. 47]. (The phrase in Greek is: καθ’ ἕκαστον ἢ τοῦ ὄντος ὡς ἔχει γνώσιν ἀλήθεια [in *Metaph.*148.14–15].) Dooley’s *scilicet* clause gives basically the “stuff” conception of logical matter, which does not account for the talk here of scientific and dialectical truth. I think we must understand ‘being as it stands’ in terms of the larger system of knowledge within which a proposition might stand.

⁷¹ Cp. in *Metaph.*177.2–3, where Alexander seems to contrast dealing with things ἐνδόξως and dealing with them ἀληθῶς. But the latter too can be understood as a higher sort of dealing truly.

request for one of a contradictory pair”), which is in a request of someone else, which is not yet an assertoric utterance nor an affirmation or a negation;⁷² another is the dialectical proposition of someone syllogizing that is also part of the syllogism coming about, which is from the matter; for a request for one of a contradictory pair is not part of a syllogism.

The structural signals of the passage make it clear that Alexander is drawing a distinction between (on the one hand) something “which is in a request of someone else” [ἥτις ἐστὶν ἐν τῇ παρ’ ἄλλου αἰτήσει] and “which is not yet an assertoric utterance nor an affirmation or a negation” [ἥτις οὐδέπω λόγος ἀποφαντικός οὐδὲ κατὰφασις ἢ ἀπόφασις] and (on the other hand) something “which is from the matter [ἥτις ἐστὶν ἀπὸ τῆς ὕλης].

Notable here is the emphasis on assertion: a genuine syllogistic proposition always has at least the form of an assertion (although, of course, it need not actually be asserted). We need not enter here immediately into a discussion of the place of assertion in logic. Alexander’s remarks, it seems to me, have also a more straightforward and obvious significance: his point would be that a person employing a syllogistic proposition is trying to *do* something—to do some work, increase our knowledge. This itself gives substance—or matter—to the person’s enterprise. It is as if besides being syntactically and (possibly) semantically different, propositions which do not find their way into syllogisms are by virtue of that fact less serious or less scientific.⁷³

It is also clear from this passage that according to Alexander to be a request is to be as yet no part of a syllogism. Once again we see matter (in a certain sense) only coming on the scene in conjunction with a syllogism (or at least what we might call a “nascent” syllogism: one “coming about”). We see the same thing at *in Top.* 21—i.e., the “asymmetrical” passage we examined just above which talks about the two varieties of eristic “syllogism.” Members of the one class, in which the form is in order but the matter faulty, he does not hesitate to call syllogisms (see, for instance, *in Top.* 21.5–6); those of the other class he refers to only as “arguments elicited in a non-

⁷² It is this sort of dialectical proposition which Alexander has in mind at *in A.Pr.* 11.21–22 when he distinguishes syllogistic propositions from dialectical. See Barnes et al (1991), p. 57, n. 26.

⁷³ Indeed, at *in Top.* 557.1, Alexander quite nearly defines syllogistic propositions as those which “are not asked pointlessly.” See also *in Top.* 553.18–21 and 556.26–7; also *in A.Pr.* 52.19–25.

sylogistic combination.”⁷⁴ For Alexander, the designation ‘syllogism’ (or ‘sylogistic’) constitutes a sort of honorific.⁷⁵

We have now a good overview of Alexander’s conception of logical matter. He regards it as taking its character from the type of practice it appears in—some practices being more worthy than others. In his commentary on the *Metaphysics*, Alexander speaks of “manner of potentiality” (a phrase we encountered above) and “choice of life”⁷⁶—which distinguish, he says, the sophist, the dialectician and the philosopher (*in Metaph.*259.35–260.20). Given the convergence of terminology and general concern, it constitutes no great leap of logic to connect all these notions with sylogistic matter. We find, therefore, in Alexander a sort of hierarchy of seriousness, at the pinnacle of which sits the true philosopher or scientist. And he sits there because he wields the most effective means of discovering the truth.

3.4 *Natural deduction in Alexander*

Before moving on to the question whether matter can be said to conclude, I would like to pause to trace a few connections between Alexander’s understanding of logical matter and the modern method of logical analysis known as natural deduction, for several of the issues that arise in Alexander arise also in the modern theory. The role of assertion is one such issue,⁷⁷ which in turn is related to the

⁷⁴ οἱ ἐν ἀσυλλογίστῳ συζυγία ἐρωτώμενοι λόγοι—in *Top.* 21.15–16. The idea is also implicit in *in A.Pr.*9.24–12.3. Notice especially *in A.Pr.*11.21–22.

⁷⁵ Alexander goes so far as to suggest that a proposition which is contained in a syllogism is a “different animal” from a proposition simply considered. He says, that is, at *in A.Pr.*44.21 that a proposition within a syllogism is a proposition in a “special sense”: ἰδίως πρότασις. He is not here feeling the lack of our English word ‘premiss’: he regards such propositions as a favoured sort, involving both logical form and logical matter. See on this Barnes et al (1991), p. 22; also Alexander’s *Conv.*56, which clearly and deliberately associates matter and form with premisses. At *in Top.* 556.26–7, Alexander defines a sylogistic proposition (or premiss) as one which contributes toward a syllogism at hand—i.e., one which contributes “to the argument.”

⁷⁶ These phrases—τῷ τρόπῳ τῆς δυνάμεως, τῆς δὲ τοῦ βίου τῇ προαιρέσει—come originally from *Metaph.*1004b24–5.

⁷⁷ This issue surfaces also in the modern controversy over Frege’s employment of the assertion sign. (See, for instance, “Function and Concept,” in Geach and Black (1980), p. 34 and Dummett (1981), pp. 491–4.) Patzig quotes and discusses an interesting—and, as we shall see, relevant—remark by Frege. He writes, “It might puzzle us for a moment that none other than G. Frege, in a letter to Jourdain from 1910, has put forward the view that ‘aus falschen Prämissen kann nichts geschlossen werden.’ But, with Frege, ‘schliessen’ is *defined* as the application of his ‘Abtrennungs-

modern issue whether the syllogistic is composed of inference schemes (as in a natural deduction system) or implications (as in an axiomatic system).⁷⁸ (In natural deduction—as opposed to most axiomatic systems—the premisses are treated *as* asserted truths).⁷⁹ My intention here is by no means to argue that Alexander actually employed modern natural deduction techniques; it is simply to point up a few parallels. A fair amount of what I say is intended to be suggestive rather than rigorously argumentative.

In the process of establishing the thesis that the proofs of Aristotle's syllogistic correspond closely to natural deduction proofs, John Corcoran argues that there are in Aristotle two types of arguments: arguments (*simpliciter*) and demonstrative arguments.⁸⁰ An example of the former would be an imperfect syllogism before it is "perfected";⁸¹ examples of the latter would be perfect syllogisms of the first figure and perfected syllogisms of whatever figure.

What makes the latter "demonstrative" is the fact that they are connected to the principles of the system:⁸² perfect syllogisms trivially so (since they are principles of the syllogistic), perfected syllogisms insofar as they are "reduced" to perfect syllogisms by means of discourses (which, again, are conducted in typical natural deduction fashion).⁸³ What makes an unperfected syllogism simply an argument is the fact that it is as yet "free-standing." It may be a perfectly valid argument insofar as, given true premisses, it will never produce a false conclusion; but it has not yet been *shown* to be so. In modern terminology, we may have a set of premisses *P* (which constitute the

regel [detachment rule], and therefore one cannot really say that he would endorse the traditional view [i.e., the view that syllogistic premisses are asserted propositions]" [Patzig (1959), p. 186]. Patzig favours the non-traditional view.

⁷⁸ This question has been much discussed. See, especially, Patzig (1959) and Corcoran (1974b).

⁷⁹ Łukasiewicz (1957), pp. 54–55. An exception to this general rule would be Frege's *Begriffsschrift* whose axioms (notoriously) are asserted.

⁸⁰ This terminology occurs in Corcoran (1972). In Corcoran (1974b), he speaks of "*P-c* arguments" and "sound deductions." It should also be mentioned that Smiley too, at about the same time as Corcoran, argued that the syllogistic is a natural deduction system: see Smiley (1973).

⁸¹ See for instance *An.Pr.* 27a17, 29a30–1 and 29b1–25; also Corcoran (1974b), pp. 95–6.

⁸² I call the first figure perfect syllogisms "principles" rather than axioms in order to avoid confusion; there is nothing preventing a natural deduction system having axioms, however. See Corcoran (1974b), p. 89. (For the notion of well-connectedness, see Corcoran (1974b), pp. 91–2, 108–10; also Corcoran (1969), pp. 162–175.)

⁸³ For two examples, see Corcoran (1974b), p. 111.

principles of a system) and it may be true that c follows from P . But we cannot assert that c is a theorem of the system until it is shown to follow from P .⁸⁴ Thus, the larger system to which an argument might be attached characterizes the strength with which it is asserted. A demonstrated argument is typically preceded by an assertion sign (\vdash),⁸⁵ which means that it is a theorem of the system. Other formulae—formulae we are hoping to demonstrate, for instance—might simply be assumed (as true).

How does this relate to Alexander? To begin with, the derived theorems of an Aristotelian science will always be necessary and organized in chains of genera and species.⁸⁶ Barnes argues as follows:

the theory of demonstrative science was never meant to guide or formalise scientific research: it is concerned exclusively with the teaching of facts already won; it does not describe how scientists do, or ought to, *acquire* knowledge: it offers a formal model of how teachers should *present and impart* knowledge.⁸⁷

Alexander would certainly agree with this. Within a formal model, all premisses and conclusions will be apodeictic in the proper sense.⁸⁸

But Alexander's realization that not all arguments belong to such a model suggests that he was also aware of the role that less well-connected argumentation might play. This role we might associate with dialectical syllogisms—or, at least, certain such syllogisms (recall Alexander's identification of two sorts of dialectical proposition: those which are not syllogistic, those which form parts of "nascent" syllogisms).⁸⁹ Alexander also discusses, in a number of places, the "investigative" syllogism, which appears to be a type of dialectical syllogism but less closely related to mere verbal exchange.⁹⁰ In any case,

⁸⁴ "If P is the axioms of arithmetic and c is a sentence which asserts that the square root of two is not a fraction then (P, c) is a valid argument. Clearly, the argument shows nothing—it is the very kind of thing for which we require a demonstration" [Corcoran (1972), p. 29].

⁸⁵ See Church (1956), pp. 82–3.

⁸⁶ See (for instance) *An.Post.* 74b5–39, 73b25–74a3.

⁸⁷ Barnes (1969), p. 138 (emphases in the original); see also Barnes (1980), pp. 176–77, where he calls Descartes as favourable witness.

⁸⁸ in *Top.* 16.29.

⁸⁹ See p. 130.

⁹⁰ That Alexander considered the investigative (πειραστική) part of dialectical method is suggested by the way he groups things at in *A.Pr.* 1.4 where he talks about the types of method falling under logic: ἡ τε ἀποδεικτική καὶ ἡ διαλεκτική τε καὶ πειραστική ἔτι τε καὶ ἡ σοφιστική μέθοδος (see Barnes et al (1991), p. 41, n. 3). At in

besides the hierarchically arranged syllogisms of the formal model, the Alexandrian approach allows the scientist to employ arguments extraneous to scientific truth strictly-conceived, although they would be employed in order to establish such truth. The parallels with natural deduction are obvious.

This set of ideas helps us to understand more fully why Alexander refers to syllogistic figures as ‘form.’ For him, logical form is not simply a matter of propositions having the same “shape”—as do, for instance, the propositions ‘every man is an animal’ and ‘every book is an object.’ With apodeictic syllogisms at least, there is definitely a link-up with Aristotle’s metaphysical notion of form. In the *in Metaph.* passage we examined above, Alexander suggests that a scientific syllogism is “better” insofar as it speaks of truth (and therefore being) “in the highest degree.” Just prior to that passage, he says that beings which are beings in the highest degree are this way because they are (or are connected with) the “eternal causes.”⁹¹ Statements which refer to these beings are true to the highest degree insofar as they are connected, by a chain of reasoning, to statements which refer to the eternal causes. Thus, while studiously avoiding any extreme form of Platonism, we can still say that, according to Alexander, apodeictic (scientific) syllogisms indicate by means of their logical form the metaphysical forms (or universals) which characterize the objects of the science one is engaged upon.

This, however, has a bearing also on non-scientific syllogisms, which, as we have seen, Alexander also regards as imposing logical form on logical matter. Although (as far as I can tell) he never states this in so many words, I believe he would hold that just as a dialectical syllogism contains a lower type of matter—i.e., matter which might be false—, so also it involves a lower type of form. It is not lower in the sense that it might be “faulty” (for, as we saw, if the figure is faulty there is no form at all) but lower in the sense that it does not deal in truth in “the highest degree.” In all respects a dialectical

*Metaph.*259.27, he describes philosophers as πειρώμενοι· περὶ ὧν οἱ φιλόσοφοι πραγματεύονται πειρώμενοι λέγειν. And just afterwards he describes the dialectic as investigative (πειραστική), as if it is a searching for what the philosopher has (or might have): πειραστική περὶ τῶν ἀληθῶν καὶ τοῦ ἐνδόξου συλλογιστική (*in Metaph.*260.4–5, also 260.5–11; see also *Metaph.*1004b25 and further *SE*169b25, where Aristotle says that ἔστι δ’ ἡ πειραστικὴ μέρος τῆς διαλεκτικῆς). Ammonius puts the investigative with the sophistical [*in A.Pr.*2.18–21], although he also regards it more favourably than the strictly-speaking sophistical [*in A.Pr.*2.22–23].

⁹¹ See *in Metaph.*147.27–148.10.

sylogism can be identical to a scientific (provided it contains apodeictic premisses)—except that it is not part of worked-out science: although possibly just as valid as a scientific one, it is not so well-connected. Even assuming that it contains true premisses, they are granted as such on an *ad hoc* basis. It is “better” for an Aristotle to be correct when he says that ‘all virtues are desirable’ than for a first-year philosophy student to be so—but this does not mean that the student’s reasoning process is necessarily invalid.

Once a dialectical (or perhaps investigative) syllogism does become part of such a science, it becomes *truly* what previously it could only pretend to be (recall Alexander’s remarks, quoted above, about the pretensions of those engaged with the dialectician).⁹² The apodeictic syllogism is, of the various types of syllogism, the “most proper” (κυριώτατος—in *Top.* 15.24–5), says Alexander. He makes it clear any number of times that he regards logic as worth the effort precisely because of its relationship to demonstration.⁹³ Everything, including syllogistic form, has as its *raison d’être* the ordered forms (or universals) which constitute an Aristotelian science.

If then there are in Alexander these parallels to natural deduction, does he have some equivalent of the assertion sign, such as might indicate that a syllogism is well-connected—or a “proper” syllogism? First of all, Alexander’s system does share with natural deduction the notion that propositions even to be considered candidates for inclusion in a worked-out science must have the form of assertions.⁹⁴ (This is to say only that he employs inference schemes rather than implications.) That said, when it comes to the equivalent of the natural deduction assertion sign—what we might call “strong assertion” or assertion *as* a theorem of a larger system—, instead of (in modern fashion) introducing a symbol, Alexander speaks of a difference in matter. Standard assertion involves one type of matter; scientific assertion another, stronger type. My suggestion—and it is only that—is that Alexander’s conception of logical matter is partially intended to capture what natural deduction captures by means of the assertion sign.⁹⁵

⁹² in *Metaph.* 260.2–11 (see above p. 122).

⁹³ See, for instance, in *A.Pr.* 4.32–5.2. The idea is also implicit in his insistence that *An.Pr.* is a preparation for *An.Post.*: see, in *A.Pr.* 8.19–9.2. (But see also in *A.Pr.* 14.18–23 where he says that *An.Pr.* looks forward to *Top.* and *SE*, as well as *An.Post.*.)

⁹⁴ See above p. 130.

⁹⁵ This approach takes Alexander (and, for that matter, natural deduction) over

One final observation—or qualification—before moving on. We know that for Alexander all the propositions of a scientific syllogism must be apodeictic, although there is a proper and a secondary way of being apodeictic. But what about dialectical syllogisms? I have been suggesting that these might also contain apodeictic propositions. Can this be right? It is clear from the arguments above that a dialectical syllogism can deal in the same sort of stuff as its scientific counterpart—it can draw on the same general stock of predicates. And it is hard to conceive of Alexander (or Aristotle, for that matter) denying that dialecticians treat certain propositions as if they were necessary. But given his conception of logical matter, it is doubtful, it seems to me, that if pressed he would award to any proposition which appears only in a dialectical syllogism full recognition as apodeictic.⁹⁶ We have seen here and in chapter 2 that, according to Alexander, one must make an effort to determine whether or not an assertoric premiss is apodeictic: it is not a case of simply taking a look. We must conceive of this process of determination, I think, as fitting the proposition into a formal model, along the lines suggested by Barnes.

3.5 *Can matter be said to “conclude”?*

Before we address the final issue, whether matter can be said to conclude, we must settle a small but important preliminary issue: What is it that we are now talking about? What do I mean, in what follows, by matter?

First of all, in previous sections I have rejected the idea that matter is stuff. Must we now always advert to the idea that “the matter of a proposition is determined by the larger system of knowledge to which it belongs”? This would make things very difficult; but, thank-

the objection raised by Patzig [see above, note 77]—i.e., that assertion belongs properly to formulae as “detached” so as to become theorems [see Prior (1962), pp. 25–6]. For Alexander there are, in a sense, two detachment rules: one for dialectical-type derivations, the other for the theorems of a system. (The former sort of detachment would not be detachment in the full sense, although it would be related to it.) There is nothing improper about having the corresponding two types of assertion (or matter, as Alexander might say).

⁹⁶ There is some evidence for this: at *in A.Pr.* 155.4ff, Alexander derives an apodeictic conclusion from two non-apodeictic premisses and then offers a series of arguments why this cannot *really* be an apodeictic.

fully, it will not be necessary. As long as we are not concerned with the differences among types of syllogism (e.g., the scientific and the dialectical), this shall not be an issue. We can speak of matter as if it were stuff, as Alexander himself often does.

Secondly, it must be acknowledged that we are now moving somewhat beyond the limited notion of matter spoken of in most of the preceding. Many of my previous remarks, that is, pertained to matter in the sense that is directly correlative with form. I shall not now cease to speak of this genuine syllogistic matter, but by matter I must now explicitly include also the sort which is not “appropriate” for syllogisms.⁹⁷ To use Alexander’s (and Aristotle’s) own image: previously I spoke mostly of steel (of various grades), not wax or other material not appropriate for the tool; now when I speak of matter I mean both, or ‘matter’ in the broader sense.⁹⁸

In any number of places in *in A.Pr.*, Alexander speaks as if, from matter adduced in order to prove invalid certain combinations, either an a-proposition or an e-proposition can be “deduced.”⁹⁹ For instance, at *in A.Pr.*55.21–6, he speaks of the invalid combination ‘AaB & BeC’:

He sets down material instances to prove¹⁰⁰ that, when the premisses stand thus, nothing necessary can be deduced (which is the proper characteristic of a syllogism). For he will prove that in some material instances it is possible for a universal affirmative to be deduced [συνάγεσθαι—55.23], and in other material instances a universal negative—and this is the most obvious sign that this combination has no syllogistic force, since contraries and opposites are proved in it and they cancel one another.

The “material instances” used are: animal (ζ)/man (α)/horse (ι); animal (ζ)/man (α)/stone (λ). The idea, then, would be that ‘ζαα & αει’ concludes to ζαι and ‘ζαα & αελ’ to ζελ. This is a very curious thing to say, of course, since at most we can say that ζαι and ζελ are assertable along *with* their respective combinations.

⁹⁷ Alexander acknowledges at *in Top.* 21.29 that the “premisses” of a non-syllogistic combinations are “specific” (in a technical sense: εἰδοποιοί). There must therefore be something upon which they make their impression.

⁹⁸ See above, note 63.

⁹⁹ On this issue, see Barnes et al (1991), pp. 12–14; Łukasiewicz (1957), pp. 67–8; Patzig (1968), pp. 169–72. What I say here about matter concluding pertains specifically to Barnes (1990), pp. 58–62.

¹⁰⁰ αὐτὸς μὲν δείκνυσιν τῇ τῆς ὕλης παραθέσει—55.22.

Barnes holds that that Alexander is much confused here: that he commits “an elementary mistake.”¹⁰¹ There seems no way around this unfortunate conclusion. On the other hand, that Alexander made this mistake points, I think, to a characterizing feature of his logic. It is therefore worth the effort to try to make whatever sense can be made of Alexander’s strange idea that matter concludes.

Let us remind ourselves of certain things we have already established. We saw in chapter 2 that Alexander differed from Theophrastus with regard to the latter’s conception of assertoric propositions.¹⁰² Theophrastus thought of an assertoric proposition as a genus “from which is abstracted [both] the modality of possibility and the modality of necessity, and does not explicitly contain either of them.”¹⁰³ This approach is similar to the “gap” approach to Greek letters: logic is not conceived of as actually containing the matter which might fill out a proposition.¹⁰⁴

We also learned above a bit more about Alexander’s alternative understanding: he conceives not of such gaps but of concrete terms, from which we might abstract a form (the sign of which abstraction is the dummy letter used in the proposition). That is, dummy letters (assuming they are parts of a syllogistic combination) effect not “empty” but “general” rules.¹⁰⁵ This means that “at will” (as Philoponus puts it) it is possible to specify the concrete proposition(s) which constitute a given combination. We must assume, I think, that something corresponds to this with respect to non-syllogistic combinations. Propositions (whether they be part of a syllogistic combination or not) exist primarily on the material level.

So then, what sense can be made of the notion that matter concludes? A grasp on it can be gained, I think, by attending to the above quotation itself, in which Alexander distinguishes between concluding necessarily and simply concluding (what we might call “deriving”). Just as propositions exist primarily at the matter-level (although their logical properties pertain to the formal level—which

¹⁰¹ Barnes (1990), p. 62.

¹⁰² See p. 95.

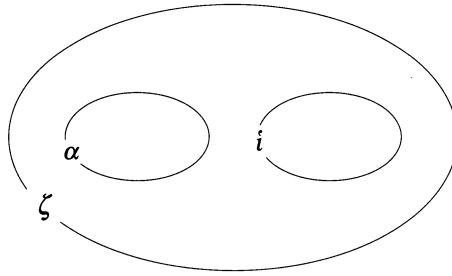
¹⁰³ See above, p. 95. Moreover, we must not forget that, according to Alexander, modality is inseparably bound up with the formal aspect of a syllogism: *in A.Pr.* 27.27–28.17.

¹⁰⁴ For an illustration of how sentential schematic letters (to which might be assigned sentences) compare to sentential dummy letters (which are understood as standing for genuine, meaningful sentences), see above, note 22.

¹⁰⁵ See pp. 116–17.

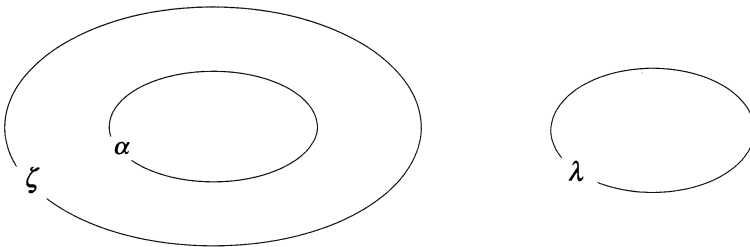
is inseparable from the material), so with deduction. That is, deduction is primarily a matter of concrete facts—but concrete facts which can be subsumed under a “general (formal) rule.”

Consider the following diagram, and read “onto” it the non-syllogistic combination ‘ $\zeta\alpha\alpha$ & $\alpha\epsilon i$ ’:



That is, understanding the relationships depicted here as the facts of the case, think first of ζ holding of α and then of α not holding of i . There is left yet a “further fact” to be derived from the diagram (i.e., these three terms): that ζ holds of i .¹⁰⁶

A similar thing can be done with ‘ $\zeta\alpha\alpha$ & $\alpha\epsilon\lambda$ ’:



Here the further fact would be that ζ does not hold of λ .

Were we to define a “further fact” formally and syntactically, we might specify that it not repeat the same two terms as any other

¹⁰⁶ In using the word ‘derived’ here I am not speaking of logical derivation: that would be to commit the error that Alexander appears to commit. I am concerned rather only with what is the case on the material level. The diagram, insofar as it represents a set of (material) facts, must include the class i within the class ζ (since all horse are animals). The “syllogism” ‘ $\zeta\alpha\alpha$ & $\alpha\epsilon i \rightarrow \zeta\alpha i$ ’ is simply our successive “attending to” the categorical propositions contained within the set of facts. Notice that, having attended to the two premisses $\zeta\alpha\alpha$ and $\alpha\epsilon i$, $\zeta\alpha i$ is the only fact left which concerns the three terms. It is in this sense that it is the “further fact” derived.

proposition in the combination. This effectively rules out the Stoics' duplicating and non-differently concluding syllogisms, which, as we saw above, Alexander regards as non-syllogistic. It also rules out conversions as syllogisms. Such a definition accords well with Aristotle's account which puts the same restrictions on the arrangement of terms in the various figures and, moreover, declines to speak of conversions as syllogisms.

When we consider the matter of a syllogistic combination, we can also pick out two preliminary facts (the "premisses") and a third further fact. For instance, along with 'animal holds of every man' and 'man holds of every Greek' ($\zeta\alpha\alpha$ & $\alpha\alpha\epsilon$), we find 'animal holds of every Greek' ($\zeta\alpha\epsilon$). We can therefore "derive" something from the diagram of ' $\zeta\alpha\alpha$ & $\alpha\alpha\epsilon$ ': considering just the matter, the further fact $\zeta\alpha\epsilon$ is no different from $\zeta\alpha\iota$ or $\zeta\epsilon\lambda$ in the two diagrams above. The logical difference lies in the fact that the combination ' $\zeta\alpha\alpha$ & $\alpha\alpha\epsilon$ ' *necessitates* the conclusion $\zeta\alpha\epsilon$, as Alexander suggests in the above quotation. On the other hand, the combination ' $\zeta\alpha\alpha$ & $\alpha\epsilon\lambda$ ' (for instance) does not necessitate $\zeta\epsilon\lambda$ —although we can "derive" it.

What we have to do, therefore, in order to make sense of Alexander's remarks is to attach a special meaning to the word $\sigmaυνάγεσθαι$. Standardly (at least in logical contexts), $\sigmaυνάγεσθαι$ means 'to deduce.'¹⁰⁷ I am connecting it here rather with the notion of "something other than the suppositions" mentioned in the Aristotelian definition of a syllogism [*An.Pr.*24b18–20].¹⁰⁸ According to the present understanding, with non-syllogistic combinations, "something other" is derived but not of necessity. Whatever the strangeness of this proposal, it is not a completely fanciful interpretation of the phrase "something other than the suppositions."

Recall again the earlier discussion of the Stoic duplicating and non-differently concluding arguments ("the Stoic arguments"). What is distinctive about these is that they are short of at least one term. For instance, if we were to diagram the argument:

¹⁰⁷ It can also, of course, mean simply 'draw together'—draw together two terms, for instance.

¹⁰⁸ This connection is made quite explicit in Philoponus, who says that with a syllogism the $\epsilon\tau\epsilon\rho\omicron\nu$ $\tau\iota$ of *An.Pr.*24b19 is definite, as opposed to the non-syllogistic syllogistic combinations which might conclude to several types of proposition (i.e., universal affirmative, universal negative, particular affirmative, and particular negative) [*Philoponus*, in *A.Pr.*34.7–10; see also 75.23–30]. These remarks may be inspired by Alexander's own: compare them with Alexander, in *A.Pr.*55.21–2, 29–30 and 56.17–18.

If it is day, it is day
 But it is day
 Therefore, it is day

we would find no further fact to derive since the whole argument involves only one term. Alexander indicates quite clearly that this is what makes the Stoic arguments unsuitable as syllogisms. At the opening of the section in which he discusses the arguments, he acknowledges that the conclusion [συναγόμενον] of a syllogism must be “something other than the suppositions.”¹⁰⁹ Once he discusses and dismisses the Stoic argument given above, he remarks: “How is it not absurd to say that that which is already supposed is derived [συνάγεσθαι] and proved?”¹¹⁰ This makes such arguments useless, he says, as proofs or dialectic or even sophistical syllogisms.¹¹¹ Thus, the difficulty here is precisely that “something other than the suppositions” cannot be derived.¹¹² On the other hand, when, a few pages later, he turns to the type of eristic syllogism (such as we saw above) which is not really a syllogism at all, he does not hesitate to speak of deriving.¹¹³ The difference between the Stoic arguments and these non-syllogistic ones can only be that the latter—but not the former—involve what I have called a further fact.¹¹⁴

The passages in which Alexander speaks of matter concluding make, therefore, some sense within their larger setting. His approach is absolutely consistent with the way he consciously chooses to use the word συνάγεσθαι—which, in turn, is consistent with his conception of syllogistic premisses and their dummy letters. Propositions, as I said, exist for Alexander in the first instance on the material level;

¹⁰⁹ Τὸ δὲ ἕτερόν τι τῶν κειμένων ὀφείλιν τὸ συναγόμενον εἶναι προσκείμενον τοῦ χρειώδους τε καὶ χρησίμου τῶν συλλογισμῶν ἐστὶ δεικτικόν—in *Top.* 9.20–1. This is a comment on *Top.* 100a25–6.

¹¹⁰ πῶς γὰρ οὐκ ἄποπον τὸ ἤδη κείμενον συνάγεσθαι καὶ δείκνυσθαι λέγειν—in *Top.* 10.13–14.

¹¹¹ in *Top.* 10.26–8 (see also 9.20–1). The implication here is that an argument in the same (or similar) form as one of the Stoic arguments but containing three distinct terms could be turned into one of the standard syllogisms.

¹¹² He also suggests a few lines later (in a passage we have already examined—see above p. 125) that the issue is not whether there is a third written (or spoken) proposition but whether that which is *signified* by the expression is capable of proving something: σημαίνόμενον διὰ τῆς λέξεως δεῖξαι τι δυνάμενον [in *Top.* 10.20–1].

¹¹³ in *Top.* 21.16.

¹¹⁴ I would not want to press too far the question of the logical difference (for Alexander) between a Stoic argument and non-syllogistic combination. Using the familiar metaphor, if the Stoic arguments are saws made of wax, an eristic “syllogism” might be a saw made of *crumbling* metal.

their logical properties, a level higher. The concept *συνάγεσθαι*, since it too belongs to the material level, is not for Alexander a logical concept—except perhaps in contexts where it clearly means “derived necessarily.”

This is all quite Aristotelian in spirit. We can certainly conceive of Aristotle insisting that we begin our logical investigations with the “matter” we find in the dialectical—even sophistical—world: that is, with arguments of every sort, the fallacious and non-fallacious, the sound and unsound. These would be the *φαινόμενα* of the investigation. From among these, we determine which arguments are of similar and (therefore) reliable form: these would be the different figures.

Of these, those which might be fitted together and into a sufficiently elaborate larger system (complete with axioms and definitions) would constitute science or knowledge in a higher—and possibly even the highest—degree. But as is always the case in Aristotle, the highest knowledge is never entirely separate from the lowest.

3.5.1 *Premises as efficient causes*

In any case, as long as Alexander maintains the distinction between deriving and deriving necessarily,¹¹⁵ it makes no essential difference that he uses the word *συνάγεσθαι* when speaking of what I have been calling mere “derivation” at the matter level. That Alexander did maintain this distinction (and that he was quite self-conscious and deliberate about it) I would like, finally, to establish by examining his comments on Aristotle’s *Phys.* 195a15–21.

In the latter passage, having set out and explained briefly the four types of cause (material, formal, efficient and final), Aristotle gives some examples: “The letters are the causes of syllables, the material of artificial products, fire and the like of bodies, the parts of the whole, and the premisses of the conclusion, in the sense of ‘that from which.’”¹¹⁶ Of this list, he says, some are causes “in the sense of

¹¹⁵ The question “What is it that makes a syllogism derive necessarily?” is simply the traditional question “What is the principle of the syllogism?” The notion that there might be a principle of the syllogism (see, for instance, Maier (1900), IIa, pp. 47–71) was much derided by Łukasiewicz [Łukasiewicz (1957), pp. 36–7]; see also Patzig (1968), pp. 78ff. (For a partial defence of Maier, see Austin (1952), pp. 398–400.) In recent years, the notion has regained respectability, although in somewhat different dress—i.e., as the notion of a principle of inference (see Thom (1981), pp. 82–86, 227–252).

¹¹⁶ *Phys.* 195a16–19.

what underlies [ὥς τὸ ὑποκείμενον], some “in the sense of essences.”

Alexander’s commentary on *Phys.* has perished, but we have fragments of it in Simplicius’s commentary. Simplicius says that within the Aristotelian list just given we can identify different ways in which something might be considered matter. He then quotes Alexander in support of this claim:¹¹⁷

“For material takes on form,” as Alexander says, “by way of alteration;¹¹⁸ letters [στοιχεῖα] and parts by way of synthesis (for also a syllable comes about from letters, as if from parts). The primary and simple bodies (which are also called the elements [στοιχεῖα] of synthesized bodies—earth, water, air, and fire) realize, however, the bodies made up of them both by way of synthesis and by way of alteration. But all these are causes which persist in [ἐνυπάρχοντα] that which they cause. Premises, on the other hand, do not persist in a conclusion but rather are productive of it, although they exist [ὑπάρχουσι] in each syllogism and assume the role of matter in it,¹¹⁹ the conclusion the role of form.”¹²⁰ But perhaps the premisses are in a way in the conclusion and <the conclusion> one [Simplicius, in *Phys.*320.1–11].¹²¹

Alexander says here, first of all, that there are two modes of being a ὑποκείμενον to a form which must be taken into consideration: ‘by way of alteration’ and ‘by way of synthesis.’ (I understand ‘by way of alteration’ to be the mode involved in, for instance, the shaping of clay into a statue. The mode ‘by way of synthesis’ involves putting together two or more things which—unlike the statue—remain in some sense distinct.) Now these two modes can pertain to a particular instance in one of four ways: either one or the other applies or both or none. Alexander states clearly which of Aristotle’s examples fall into which of these categories, the most interesting being, of course, the fourth: that which is ὑποκείμενον to a form neither ‘by way of

¹¹⁷ See Barnes (1990), p. 40.

¹¹⁸ κατὰ ἀλλοίωσιν—320.1: cf. *Phys.*192b15.

¹¹⁹ ὕλης ἔχουσιν ἐν αὐτῷ λόγον, τὸ δὲ συμπεπερασμένον εἶδους—in *Phys.*320.9–10. There are similar expressions (in similar contexts) at Ammonius, in *Int.*111.20, Philoponus in *A.Pr.*65.12. See also Alexander, in *Metaph.*351.13–15; Philoponus, in *A.Pr.*6.2, 44.24; Ammonius, in *Int.*88.27 and Ammonius, in *A.Pr.*4.9–11.

¹²⁰ Alexander acknowledges at in *Metaph.*351.12–14 that, if you consider the whole syllogism, the premisses do make up a synthesis. For the notion that the premisses represent matter and the conclusion form, see Philoponus, in *A.Pr.*32.25–33.2.

¹²¹ μήποτε δὲ καὶ ἐν τῷ συμπεράσματι τρόπον τινά εἰσιν αἱ προτάσεις καὶ ἐν ἑστίν—320.10–11. In the Diels edition of in *Phys.*, the quotation is never closed. Alexander often uses μήποτε in this sense of *nescio an*—but so does Simplicius. Since the point goes against what is said just previous to it, I give it to Simplicius.

alteration' nor 'by way of synthesis.' Premisses fall into this class.

Alexander's position is a subtle one. He obviously wants to maintain the Aristotelian idea that in some sense the premisses are matter, but he realizes too the dangers inherent in this: according to his own principles, no syllogism deduces anything only on account of its matter. Were this the case, it would not be a syllogism at all: it would be an invalid combination (such as we saw in the above diagrams)—inert matter, without the essential "push" of necessity. So, besides matter, he insists on an active (or efficient) causal aspect to the premisses of a syllogism. Unlike the other three categories, the *ὑποκείμενον* among members of the fourth does not persist in the final product as matter. Matter persists (or actually, as Alexander insists on another verb here, "exists") in the *syllogism*—but there it is distinct from the conclusion, as matter is distinct from form. Alexander might be regarded as overstating his case, since the matter of the premisses does in some sense come into the conclusion (although the matter represented by the middle term drops out of consideration)—and this gives rise to the last sentence of the passage (which I have attributed to Simplicius). Nonetheless, it is clear that Alexander is interested in isolating that which makes a conclusion, *as* conclusion, different from the matter from which it emerges.

This is the distinction we are looking for: the necessity (as opposed to the matter) which "makes" it the case that the conclusion follows. Thus, if Alexander rather confusedly thought matter might "conclude," he saw very clearly that it does not do so syllogistically (i.e., necessarily).

3.6 Conclusion

This has not been a neat and tidy chapter; but it was not meant to be. Nowhere does Alexander set out clearly his conception of logical matter, although it is just as clear that the notion is important for him. The best that can be done, I think, is to go through the several passages where logical matter plays a prominent part, comparing the passages and working with them in order to see whether a coherent picture emerges. This I have done, with results which are not completely satisfying: a picture has emerged but it is still very much a picture in broad outlines, some of which may be stray and (therefore misleading) strokes of the original artist. Perhaps, however, my efforts

may help to stimulate future research not only in Alexander but in the tradition of Aristotelian scholarship to which he gave rise.

Alexander gives us, I think, a potentially fruitful alternative to the modern conception of logical form and logical matter, as this alternative might be employed in interpreting ancient texts. Its potential lies in its ability to relate logical form and matter to Aristotle's metaphysical ideas about the corresponding concepts. But neither should we overlook the possible fruitfulness of his conception of logical matter itself. According to this conception, matter plays a much larger *logical* role than we are used to in modern theories. But there is nothing demonstrably illicit in this greater prominence. As at the end of chapter 1, we see again that there is reason to throw aside Łukasiewiczian scruples about the supposedly "non-logical." Alexander uses the term ὕλη in a number of senses, but they can all be conceived of as suitably logical. Corresponding to each sense of logical matter—e.g., matter as stuff, matter as figure, matter as degree of scientific confirmation—there is a corresponding sense of logical form with which it is wholly correlative.

I might mention finally that there are other difficulties with Alexander's approach—besides his notion of matter concluding. The main one would be this: Alexander, as I said, clearly wants to connect logical form and matter with metaphysical form and matter. But metaphysical form and matter pertain to the individual sciences. If we abstract from the matter of the propositions of the individual sciences, we get not logic but the sciences themselves, perhaps set out in a formal model. One might legitimately ask, therefore, whether the abstraction of logical form has any real connection with the abstraction of "metaphysical" form. If it does not, that part of Alexander's theory which mirrors most closely the metaphysical ideas comes to enjoy less inherent interest—however truthfully it reflects the mind of the Philosopher.

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[†] CAG = *Commentaria in Aristotelem Graeca*.

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APPENDIX

LOGICAL SYMBOLS AND CONVENTIONS

In representing Aristotelian syllogisms, I use the symbols introduced by Patzig [Patzig (1968), pp. 1–2, 8–12, 49–50]. Capital letters A, B, C, etc., represent terms; lower case letters represent categorical relations: a = ‘holds of every’; e = ‘holds of none’; i = ‘holds of some’; o = ‘does not hold of some.’ Thus, for example, AaC is to be read ‘A holds of every C’; BiA, ‘B holds of some A.’ The symbol ‘N’ preceding a premiss or conclusion represents ‘necessarily.’ As is well known, Aristotle isolates two senses of possibility [*An.Pr.*25a37–9]: possibility in the broad sense which includes necessity (which I call possibility-1) and possibility in the strict sense which means ‘neither necessary nor impossible’ (possibility-2). Where this distinction is important to the argument, I use the symbols M¹ and M². Thus M²AaC would read, ‘A possibly-2 holds of C’ or (more felicitously), ‘It is contingent that A holds of C.’

I also use the symbols ‘&’ and ‘→’, the first serving to join two premisses into a “combination,” the second indicating that a conclusion follows immediately after. Thus, ‘AaB & BaC → AaC’ stands for the syllogistic mood Barbara (‘A holds of every B and B holds of every C; therefore, A holds of every C’). ‘AaB & BaC → AaC’ is not an implication but an inference scheme. (I also occasionally refer to non-syllogistic combinations by means of ‘&.’) If the mode of a conclusion within a certain context is as yet undecided, I use the symbol ‘?’, as in ‘NAaB & BaC → ?AaC.’ The symbol (E) is the existential quantifier; for the universal quantifier, I use ().

When speaking about *reductio* proofs, ‘original syllogism’ means the syllogism giving the conclusion the following of which is to be proved; ‘*reductio* syllogism,’ the syllogism used to prove that this conclusion follows. The ‘*reductio* premisses’ are the premisses of the *reductio* syllogism; the ‘original conclusion,’ the conclusion of the original syllogism, and so forth.

Lemmon uses a number of abbreviations in his system of natural deduction, and I take some of these over. RAA stands for *reductio ad absurdum*; &E stands for ‘and elimination’; &I stands for ‘and introduction.’ For details, see Lemmon (1965), pp. 19–21, 26.

Lemmon also employs two procedures which are pertinent to what I do in chapter 1. The first is called “the rule of existential quantifier introduction” (or EI). According to this rule, if in a proof a formula such as ‘Fm’ appears (‘F’ being a “predicate letter” and ‘m’ being a “proper name” [Lemmon (1965), p. 93]), we can assert the formula (Ex)(Fx). As Lemmon explains it, “given a particular object with F, we can conclude that *something* has F” [Lemmon (1965), p. 111]. The second procedure is called “the rule of existential quantifier elimination” (or EE). It allows one to cancel the assumption that an arbitrary object has a certain property, after having derived from it and other elements of the proof a desired formula.

Lemmon offers the following proof as illustration of both rules (but especially EE) [Lemmon (1965), p. 113]. (The proof also employs the fairly well-known “rule of universal quantifier elimination”—here UE—which permits the substitution of the universal quantifier by a non-quantified formula.) It runs as follows:

	(x)(Fx → Gx), (Ex)Fx	⊢ (Ex)Gx
1	(1) (x)(Fx → G)	A
2	(2) (Ex)Fx	A
3	(3) Fa	A

1	(4) $Fa \rightarrow Ga$	1 UE
1,3	(5) Ga	3,4 modus ponens
1,3	(6) $(\exists x)Gx$	5 EI
1,2	(7) $(\exists x)Gx$	2,3,6 EE

Step (3) represents the introduction of a “typical disjunct” (i.e., the assumption which will eventually be canceled). At step (6), EI is used to introduce an existential quantifier (exploiting ‘Ga’ of line (5)). At step (7), EE is used to cancel the assumption ‘Fa’ of step (3) and to assert $(\exists x)Gx$ which was derived on the basis of that assumption and also the assumption $(\exists x)Fx$ —which was step (2). The two numbers on the far left of step (7) signify that the conclusion now rests on the basis of steps (1) and (2) only.

In chapter 1, I add various rules and definitions to Lemmon’s system and also employ analogues to rules and procedures he proposes. For instance, I assume that it is permissible to quantify over predicates. This is needed, for instance, in order to employ the two “ecthetic” rules developed by Łukasiewicz (and Patzig) (which I add at one point to the system):

- (i) $AiB \leftrightarrow (\exists X)(AaX \ \& \ BaX)$
- (o) $AoB \leftrightarrow (\exists X)(AcX \ \& \ BcX)$

Such a procedure (i.e., quantifying over predicates) could be made more formal and included in a Lemmon-type system. Since, however, my purpose in using natural deduction upon Alexander’s writings is not to formalize his proofs but simply to demonstrate their structure, I do not make any effort to do this.

As another short cut, I assume that we can go from a pair of premisses such as ‘ $AaC \ \& \ BaC$ ’ to their existential quantification: $(\exists X)(AaX \ \& \ BaX)$. This is based on the same intuition that allows Lemmon’s EI: that “if a certain thing has a certain property, then something must have it” [Lemmon (1965), p. 111]. It is clear that if A holds of all things that fall under the term C and B holds of all things that fall under the term C, there exists a term such that A holds of all that falls under that term and B holds of all that falls under that term. In the proofs in chapter 1, I call this rule EI^a.

I employ another variation of the Lemmon’s EI when a predicate is said of something and that something is known to be part of the class picked out by another predicate. When this occurs, we can go immediately to the Aristotelian approximation of an existential quantifier (i.e., an i-proposition). Thus, for instance, from a location such as $A \ \lambda \acute{\epsilon} \gamma \epsilon \tau \alpha \iota \ \kappa \alpha \tau \grave{\alpha} \ \pi \alpha \nu \tau \acute{\alpha} \varsigma \ \tau \omicron \upsilon \ \alpha$ and the location $\acute{\epsilon} \sigma \tau \iota \ \tau \grave{\iota} \ \tau \omicron \upsilon \ \beta$, we can assert AiB , using what I call EI^b. The intuition here is, again, similar to Lemmon’s for his EI: if a thing of a certain type has a certain property, then something of that type must have it.

Note also that, in depictions of Alexander’s proofs in chapter 1, the usual existentially quantified propositions do not normally appear. Instead, propositions appear in their categorical forms—e.g., as ‘ BiA ’—although occasionally I give also the corresponding existentially quantified form (e.g., ‘ $(\exists x)(Bx \ \& \ Ax)$ ’). This difference in notation might be thought of as representing a difference between Aristotelian logical form and that of modern quantified logic. Ferejohn argues persuasively that Aristotelian categorical propositions are “referential” [Ferejohn (1991), pp. 43–4, 107]. (See also Mignucci (1965a), pp. 156–58.) A “referential universal” is understood as “expressing a multitude of singular propositions.” Thus, rather than, as in post-Fregean logic, expressing the existential import of an Aristotelian universal like ‘all men are animals’ by attaching to the standard formulation (‘if anything is a man, it is an animal’) the addendum ‘and there are men,’ the referential universal is presumed to be about certain existing individuals [Ferejohn (1991), pp. 43–4]. One good reason for avoiding the addendum ‘and there are men’ is that the phrase might not refer to the same men spoken of in ‘all men are animals’—i.e., the condition would be satisfied if ‘and there are men’ referred to fewer men than spoken of in ‘all men are animals.’ “Now a parallel point,” says Ferejohn, “can be made

for the Aristotelian particular statements. On this general way of understanding the relation between existence and predication, just as ‘every S’ is a term that purports to refer to every one of the actual Ss, so ‘some S’ should likewise be regarded as a discrete referring term whose purported reference is some subset of the actual Ss” [Ferejohn (1991), p.107].

I employ a few other special devices and conventions in chapter 1 (and elsewhere), including the following equivalences:

$$\begin{aligned} (uk) \quad & x \text{ ὑπάρχειν } y \leftrightarrow x \text{ κατὰ παντός } y \\ (ke) \quad & x \text{ κατὰ παντός } y \leftrightarrow y \text{ ἐν ὅλῳ τῷ } x \\ (te) \quad & x \text{ τὸ τοῦ } \leftrightarrow x \text{ ἐν ὅλῳ τῷ } y \end{aligned}$$

Other variations from standard practices I explain in the text.

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